

1986 D.A.T.E.

1986 D.A.T.E. PROGRAM - FORAGE IMPROVEMENT PROGRAM FOR VANCOUVER ISLAND - ACCELERATED EDUCATION OF FARMERS - THE ESTABLISHMENT AND MANAGEMENT OF A RANGELAND SEEDING - GRAPE EVALUATION ON VANCOUVER ISLAND - RASPBERRY TRANSPLANT QUALITY SURVEY - DEMONSTRATION AND EVALUATION OF VEGETABLE SEEDING AND PLANTING PRACTICES - EVALUATING COMMUNITY PASTURE RENOVATION SYSTEMS - KIWIFRUIT PRODUCTION - EVALUATION OF HIGH ENERGY FORAGES FOR INTENSIFYING LIVESTOCK PRODUCTION IN THE OKANAGANKOOTENAY REGION - CONTROL OF PEAR TRELLIS RUST IN RICHMOND, B.C. - RANGE DEMONSTRATION UNIT - CACHE CREEK - IDENTIFYING MAJOR FACTORS THAT AFFECT SILAGE QUALITY - EFFECT OF MATURITY ON FORAGE QUALITY AND QUANTITY - TECHNOLOGY TRANSFER - GRAPE PRODUCTION - MICRO CLIMATE AND NUTRITIONAL REQUIREMENTS OF COMMERCIAL GINSENG PRODUCTION - ONION DISEASES IN THE SOUTH COASTAL REGION - CAUSE AND CONTROL OF PARSNIP CANCER - FUMIGATION OF COLE CROP SEEDBEDS - INTENSIVE APPLE REPLANT DEMONSTRATION PROJECT - DEVELOPMENT AND IMPLEMENTATION OF POTATO INTEGRATED PEST MANAGEMENT - FRANCOIS LAKE ROTATIONAL GRAZING AND FALL PASTURE - IMPROVING B.C. FRESH STRAWBERRY MARKET SHARE - ASIAN PEAR VARIETY DEMONSTRATION FOR COASTAL B.C. - EARLY WEANING OF

Demonstration of Agricultural Technology and Economics Projects



Province of British Columbia
Ministry of Agriculture and Fisheries

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D.A.T.E. PROGRAM REPORT

Demonstration of Agricultural Technology and Economics

Submitted by:

R.J. Miller (Chairman)
A/Assistant Deputy Minister
Field Operations

B.A. Hackett
Assistant Deputy Minister
Financial Assistance Programs

R.N. Kohlert
Regional Director
Central Region

D.E. Freed
Director Rural Organizations
& Services Branch
D.A.T.E. Program Co-ordinator

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TERMS OF REFERENCE

D.A.T.E. funds may be used for:

1. Evaluating and demonstrating known technological advances for enhancing the production, processing and marketing of agricultural products.
2. Supporting adaptive research projects aimed at solving priority problems confronting British Columbia agriculture.
3. Investigating production, processing and marketing systems to identify or substantiate the need for new technology.
4. Supporting mission-oriented trips with the objectives of: investigating innovative production, processing and marketing techniques for import or ultimate adaption in this Province; and/or investigating export opportunities for British Columbia agriculture and fisheries technology.
5. Importing expertise to assist in introducing new technology or to advise on critical problem situations.



1986 D.A.T.E. PROGRAM

The D.A.T.E. (Demonstration of Agricultural Technology and Economics) Program provides funding for British Columbia Ministry of Agriculture and Fisheries staff supervised projects.

Forty-six ongoing or new projects were reported on in 1986. Included below are highlights from a few of the areas studied.

- A demonstration of the suitability of renewable energy in pumping livestock water on rangeland using photovoltaic technology was carried out in the Cache Creek area. The results were encouraging. Consideration is being given to an inter-connected wind and solar system.
- Diseases of vegetable crops including parsnips, cole crops, and celery were subjects of D.A.T.E. projects in 1986. Losses to vegetable producers will be decreased as a result of work done.
- Two projects were devoted to improved greenhouse technology. One studied the use of a data logger to evaluate greenhouse energy conservation; the other brought an expert in greenhouse heating to British Columbia from the Netherlands to share his knowledge with B.C. greenhouse growers.
- Several projects addressed silage quality. Areas considered included improved silage sampling tools and techniques; the utilization of round bale silage systems and a study to determine the effects of different cutting dates on the quality and quantity of silage produced over the growing season.
- An ongoing project to determine the cultural strategies for the production of American ginseng continued in the Lytton area. The first harvest of American ginseng occurred in the fall of 1986. The results look very promising for the future of this crop in British Columbia.
- Farmer education was enhanced through a project that expanded the audio visual programs on modern agricultural methods available to producers. In addition it provided video programming equipment and training for staff which will enable them to improve this type of technology transfer.
- An integrated Pest Management project was carried out for potatoes. As a result potato growers now have the information they need to accurately time pesticidal sprays for effective disease and insect control.

The D.A.T.E. Program Committee would like to acknowledge the co-operation of the project supervisors in the implementation of the 1986 D.A.T.E. program. The D.A.T.E. program continues to be a very valuable vehicle for carrying out research and demonstration projects.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

FORAGE IMPROVEMENT PROGRAM FOR VANCOUVER ISLAND

Project Number: 94

Supervision: Peter Jones, District Agriculturist, B.C. Ministry
of Agriculture and Fisheries, Courtenay.

Co-operators: Vancouver Island Sheep Breeders Association
Field Angus Club.

Branches: Regional Extension Services, South Coastal Region
Field Crops Branch.

Funding: D.A.T.E. 1986 \$948.00

Objective: Evaluate new forage species for Vancouver Island.

SUMMARY: Two sources of Tall Fescue, Meadow Fescue and Italian
Ryegrass were sown and compared to the more commonly
grown Timothy, Perennial Ryegrass and Orchardgrass.

The nutritive value of all of these species and varieties
have been monitored for 5 years and these results are
summarized in Table 1.

TABLE 1

MACRO NUTRIENT ANALYSIS

(4 cuts per year x 4 years)

	%ADF	%TDN	%DE	%CP
Tall Fescue 1039	28.8	68	1.37	17.47
Common Tall Fescue	32.1	65	1.30	14.67
Timothy	29.7	67	1.35	15.97
Meadow Fescue	29.52	67	1.35	18.03
Italian Ryegrass	29.18	69	1.38	15.61
Perennial Ryegrass	30.18	67	1.35	17.33
Orchardgrass	29.11	68	1.37	17.84

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Summary:

It would appear that while there are differences in nutrient analyses between species and varieties, these are not so important as the differences within any one species or variety due to stage of growth. In other words, the time of harvesting these grasses, i.e. pasture, silage, hay or fall pasture, has a much greater influence on determining its nutritive value than the choosing between species and varieties.

The reason for choosing one species over another should be based more on the soil type and climate and its ability to perform well in terms of grazing, silage or hay.

Varieties of grasses are more important in terms of date of heading, seasonal distribution of growth, drought tolerance, persistency and disease resistance, and therefore should be chosen with these characteristics in mind.

The micro nutrient analysis suggested that unlike the major nutrients the stage of growth when sampled was not important. Selenium was always deficient and Cu and Zn tended to be on the low side. Iron and Manganese showed the high readings and wide variations.

The newly introduced species performed as well as, if not better than the more conventionally grown grass species under farm conditions from 1980 - 83.

From 1984 onward, there was a noticeable decrease in sown grasses in the Meadow Fescue, Italian Ryegrass, Perennial Ryegrass and Orchardgrass plots. It was not possible to determine if this decrease was due to winter kill, drought, leatherjacket damage, or poor genetical material. Whatever the causes, they did not affect the Tall Fescues or Timothy to the same extent.

Italian Ryegrass has always been a short lived species, but with high fertility and moisture, can probably outproduce most grasses over a one to three year period.

Meadow Fescue, while highly nutritious does seem to lack the persistency and growth of the Tall Fescue.

Tall Fescue has been outstanding at this site. It is obviously well suited to the heavier clay soils with pH in the 5.5 range and remains green in drought conditions when all the other species dry up.

From visual assessment, it was one of, if not the heaviest producer, starting growth 3 weeks earlier than Orchardgrass and remaining green and productive later than Orchardgrass.

Despite the coarseness of the leaves, Tall Fescue 1039 was as nutritious as the other grasses at equal stages of growth. It also dried faster than the other grasses, enabling it to be baled 12 hours sooner. The Canada No. 1 Tall Fescue was stemmier and of lower feed value. It also showed a tendency to rust susceptibility in late fall.

Whenever stock, cattle, horses, sheep or goats grazed the plots, no preference was shown towards any one species if they were at the same stage of growth.

It would appear that Tall Fescue has a bright future especially on the colder, wetter clay soils where Orchardgrass dies out and producers do not want to grow Perennial Ryegrass.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

ACCELERATED EDUCATION OF FARMERS (THROUGH ADVANCED EXTENSION
TECHNIQUES)



Ministry Staff Shooting Own Video Programs

Project Number: 103

Supervision: Ron Sera

Co-operators: David Kent, Media Production Centre, Kelowna

Branches: Information Services

Funding: D.A.T.E. 1986-87 \$18,000

D.A.T.E. PROGRAM REPORT 1986

- Objectives: To substantially increase farmer education through advanced extension techniques including:
- the provision of a library of agricultural audio-visual programs depicting modern agricultural methods.
 - the provision of video programming, equipment, and training for ministry field staff thus improving their ability to transfer technology to farmers.

Summary: Farmers continually strive to be aware of and make use of the latest practical technology that will help them produce food efficiently and profitably. The Ministry's extension service is designed to help farmers apply these modern cultural and management technologies in the most effective way possible. While one to one counselling, demonstration and printed publications have been the major technology transfer tools used by ministry staff, the value and use of audio-visuals, specifically video programs, has become much more evident in recent years.

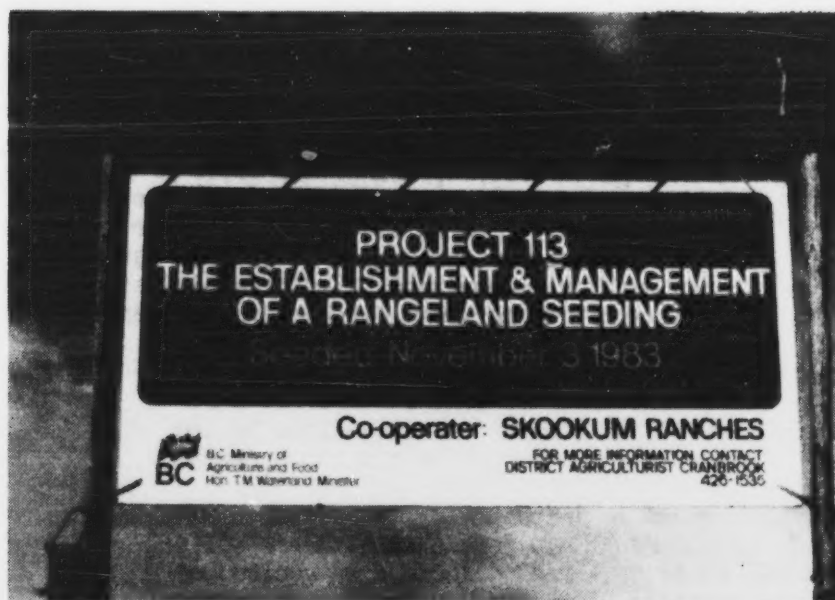
The objective of this project at inception was to allow staff to make best use of this communications technology by equipping them with video recording equipment and giving them basic training in video programming. This is being followed by building an inventory of audio-visual programs as library loan-outs, upgrading the Ministry's video editing capability, and eventual designing of integrated instructional aids (a/v-publication-computer combinations) for use by extension staff and farmers.

As of 1986/87, a total of 25 staff received direct a/v production training with several more training sessions tentatively planned for 1987. During 1986, four portable video cameras (Hitachi camcorders) and related gear were purchased to enable staff to use the cameras easily in the field. At year end, over 40 video projects were underway with many staff indicating more programs on the horizon. Although the response is overwhelming, the major obstacle facing the project is the anticipated lack of available post-production (video editing) capability to complete the programs now in progress or pending.

The library of video tapes has expanded substantially over the past four years to a total of 274 separate titles. Loan-outs have varied, but have at one time averaged as high as 7 per week.

Although the acceptance and use of video programming on farms has been relatively slow because of traditionally held and well-founded beliefs in personal contact, it appears that interest and use has mushroomed over the past year with strong signs that the trend will continue. Farmers will undoubtedly gain significantly by being made aware of agricultural techniques depicted on video programs from around the world which would otherwise be unavailable to them. As well, ministry staff will be able to better transfer their knowledge by effectively using video programs produced themselves in their extension work.

THE ESTABLISHMENT AND MANAGEMENT OF A RANGELAND SEEDING



Project Site Identification

Project Number: 113

Supervision: R.M. Tegart, Field Crop and Range Specialist, Creston
M.J. Malmberg, District Agriculturist, Cranbrook

Co-operators: Dr. W.O. Green, Skookum Ranches, Skookumchuk
L.G. Brown, Engineering Technician, Kamloops
H.G. Geldart, Regional Farm Economist, Summerland

Funding:	D.A.T.E. 1982 - 83	\$1,018
	D.A.T.E. 1983 - 84	\$6,260
	D.A.T.E. 1984 - 85	\$3,150
	D.A.T.E. 1985 - 86	\$2,500
	D.A.T.E. 1986 - 87	\$2,650

D.A.T.E. PROGRAM REPORT 1986

Objectives: To demonstrate the tillage and seeding requirements necessary to ensure a successful seeding.

To demonstrate the management of a Crested Wheatgrass/Alfalfa seeding via animal performance, seeding productivity and an economic evaluation.

To provide additional information on species and variety selection, fertility requirements and the economics of fertilization.

Summary: Objective one was demonstrated by using the Rangeland Seeder (November 1983) to prepare the seedbed and place the seed. The grass/alfalfa mixture germinated in 1984 and an excellent Crested Wheatgrass/Alfalfa stand is now very evident.

In 1986 a combination of steers and cow/calf pairs grazed the site. Animals were turned out onto the seeding April 20, 17 days prior to adjacent crownland turnout. They were moved from the seeding to the adjoining native range then the steers returned to the seeding and the cows were removed for breeding. In total the site was grazed from April 20 until June 30, 1987. The steers were weighed and their rate of gain calculated over a 65 day period. The herd average was 2.6 pounds per day with individual animal performance ranging from 1.9 to 3.5 pounds per day. Seventy-five percent of the steers gained between 2.2 and 2.9 pounds per day. This translates to 84 pounds of beef produced for every acre of Crested Wheatgrass/Alfalfa grazed.

GRAPE VARIETY EVALUATION ON VANCOUVER ISLAND



District Horticulturist Brent Warner and John Vielvoye with a sample of the 1986 experimental grape harvest from the Duncan grape site.

Project Number: 125

Supervision: John Vielvoye, Provincial Grape Specialist, Kelowna

Co-operators: Brent Warner, Horticulturist, Sidney
Peter Fofonoff, Agriculturist, Duncan; Crop Protection
Branch, Victoria and Kelowna
Dennis Zanatta, Landowner, Duncan
Ministry of Environment, Climatology

Branches: Regional Extension Services - Okanagan/Kootenay
- South Coastal

D.A.T.E. PROGRAM REPORT 1986

Funding: D.A.T.E. 1986-87 \$2,000

Objective: To determine the suitability of the Duncan area of Vancouver Island for Grape Production.

Summary: Grape vines entered the 1985-86 winter in various stages of maturity. Temperatures of -17°C late in October 1985, and -14°C in February, 1986, contributed to severe bud and plant injury. Varieties most affected were Pearl of Csaba, Siegerrebe, Schonburger, Weissburgunder, Muller Thurgau, Precoce de Malingre, Kerner, Chardonnay.

Severe crown gall (bacteria infection) appeared in late August on the varieties Ortega, Siegerrebe, Ehrenfelser, Madaleine Angevine, Auxerois, Madaleine Sylvaner, Aurora, Venus, Okanagan Riesling, New York Muscat, Interlaken, Gamey Noir, Festivee. Affected vines have been treated with Gallex.

A bird net was installed to protect the entire vineyard. Fresh market grape varieties, Sovereign Charter, Interlaken and Reliance were test marketed. Sovereign Charter was preferred. It will likely be used as a fresh eating grape, but also for juice and jam.

Wine varieties are being sold to local home winemakers. There is good local demand for both the fresh and wine grapes. Experimental wine-making will continue for this project at Agriculture Canada, Summerland. Many of the 1985 wines from this project have received very favorable comments from professional wine tasters as well as other wine lovers.

The varieties Pearl of Csaba, Schonburger, Muller Thurgau, Precoce de Malinger, Chardonnay, N.Y. 21572, Reliance, Suffolk, Red Festivee, Sovereign Jubilee, Sovereign Tiarra, and Sovereign Gold appear to be unsuitable to this site, and will therefore be removed from the vineyard. Others will be chosen to replace them in 1987.

Harvest in 1986 began September 22 and was concluded on October 28. A summary of harvest data is available.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

RASPBERRY TRANSPLANT QUALITY SURVEY

Project Number: 134

Supervision: W.S. Peters, Provincial Berry Specialist, Abbotsford

Co-operators: Dr. H.A. Daubeney, Dr. R.R. Martin, Dr. H.S. Pepin and
Dr. T.C. Vrain, Agriculture Canada, Research Station
Vancouver.
Mr. Ed Ross, Agriculture Canada, Food Production and
Inspection Branch, Burnaby and;
Dr. R.J. Copeman, University of B.C., Department of
Plant Science, Vancouver

Project Contractor Mr. Michael McCann, Vancouver

Funding: D.A.T.E. 1984-85 \$ 3,800
D.A.T.E. 1985-86 \$10,400
D.A.T.E. 1986-87 \$ 7,200

Objectives: To document the variable quality of raspberry planting
stock being used by B.C. growers and to demonstrate the
superiority of Certified pathogen-free planting stock.

Summary: Transplants from the 36 samples collected in the 1985
survey and field tested at the Agriculture Canada
Abbotsford sub-station were rated in the spring of 1986
for vigour, number of fruiting canes and mortality. Each
plant was then uprooted, examined for crown-gall and fine
roots removed for nematode analysis. Commerical
plantings of plant lots from which the above samples were
taken were rated for mortality and vigour compared to the
test plants.

The 29 samples in the 1986 survey consisted of the 4 main
varieties grown in the Fraser Valley (Willamette,
Chilcotin, Meeker, Skeena). The samples included
certified plants from Washington State and B.C., as well
as local non-certified plants. These plants were
examined for vigour, disease and nematode infection. In
addition, sub-samples were maintained in the greenhouse
for virus and additional nematode testing.

D.A.T.E. PROGRAM REPORT 1986

It was found that transplants with large cane diameters and well branched fibrous root systems, planted early in the season, had the greatest survival rate and produced the most primocanes.

No Phytophthora root rot was detected in either of the 2 survey years nor was raspberry bush dwarf virus or tomato ring spot virus. DsRNA analysis confirmed the presence of raspberry leaf spot virus in a local non-certified 'Willamette' sample.

The lesion nematode was found in 83% of the non-certified transplants sampled in 1985 and in 73% in 1986. Also, in 1985 and 1986 36% of the imported "certified free of pathogen" transplants contained levels of root lesion nematode infection higher than the acceptable tolerance in the British Columbia program. None of the B.C. certified stock had detectable levels of root lesion nematode.

The nematode free or relatively free transplant stock planted in non-fumigated land became heavily infected after only 13 months, clearly pointing out the futility of planting certified nematode-free stock into non-fumigated land.

Certified pathogen 'free' raspberry material from the Washington State certification program is obviously not free of pathogens detrimental to the establishment of raspberry transplants.

1986 - ROOT LESION NEMATODES PER GRAM OF DRIED ROOTS

<u>B.C. Non Certified</u>	<u>B.C. Certified</u>	<u>U.S. Certified</u>
(11 Samples)	(2 Samples)	(16 Samples)
20 (5)*	No infection	112 (28)*
532 (133)		228 (57)
224 (56)		40 (10)
16 (4)		8 (2)
4 (1)		12 (3)
8 (2)		3
8 (2)		
8 (2)		
3 samples - no infection		10 samples - no infection

*(nematode density in fresh roots)

DEMONSTRATION AND EVALUATION OF VEGETABLE SEEDING
AND PLANTING PRACTICES



Reemay Tunnels Increased Earliness and Total Production of Cucumbers

Project Number: 144

Supervision: G.S. Emmond, Regional Horticulturist
B.C. Ministry of Agriculture and Fisheries, Prince George

Co-operators: John Curtis, vegetable grower, Taylor (Peace River)
Robin Tutte, vegetable grower, Prince George
Penny Curry, gladiolus grower, Quesnel
Hildo Hoek, vegetable grower, Smithers
Anne Rauschenberger, vegetable grower, Terrace
Co-operators contributed land, irrigation water, some
weed control and most of the harvesting.

Branches: Regional Extension Services. Central/Peace River region.

D.A.T.E PROGRAM REPORT 1986

Funding: D.A.T.E. 1986-87 \$600
D.A.T.E. 1987-88 \$600

Objectives: To evaluate early maturity and yield of vegetables;
1) directly fall seeded, fluid spring seeded and normal spring seeded;
2) grown under hot tents, floating mulch, slitted plastic tunnels and on bare ground; and
3) grown on black plastic, clear plastic and on bare ground.

Summary: Late Fall Seeding: Trial results at both Taylor and Prince George show that fall seeding of vegetable crops is unacceptable to growers, due to poor emergence and survival of the seedlings, extensive bolting action of the surviving plants and poorer quality of such vegetables as carrots and parsnips. Factors contributing to these problems are wet conditions after fall seeding, severe soil crusting in the spring, abrasive action of wind and soil, too dry and cold conditions for proper growth and very early insect damage.

Fluid and Normal Spring Seeding: At Prince George under severe soil crusting conditions, seed germination and emergence was considerably better for all crops when fluid seeded. This trial will continue in 1987.

Plastic Culture: The benefits of using black plastic mulch (B.P.M.) alone or in combination with plastic or Reemay coverings has been accepted by several growers in the Central and Peace River regions as a means of increasing earliness and total production of warm season crops, particularly field cucumbers. Areas such as Terrace, with consistently warmer night-time temperatures benefit nearly as much from B.P.M. alone as it does from B.P.M. plus a cover. However, any area that has cool night-time temperatures require the B.P.M. plus the coverings of plastic or Reemay for good production. In areas where light frosts occur during the growing season Reemay tunnels are essential for plant protection and growth. Trials show that Reemay can be used a second year, provided it is stored in a dry and dark location.

The use of plastic culture has resulted in fewer acres being planted to cucumbers because of possible over-production on the farms, thus releasing this land for other types of crop production.

Plastic culture advanced the flower head cutting dates of gladiolus by 7-10 days. Further trials are planned for 1987.

EVALUATING COMMUNITY PASTURE RENOVATION SYSTEMS



Rotovating sod prior to plowing

Project Number: 146

Supervision: Erich Schulz, Engineering Branch

Co-operators: Garth Elgie, District Agriculturist, Prince George
Jim Tingle, Field Crops Specialist, Prince George
Rob Kline, Soils Specialist, Prince George
W/M Community Pasture Association, Prince George
Agriculture Canada Research Station, Prince George

Funding: D.A.T.E. 1984/85 \$ 3,450
D.A.T.E. 1985/86 \$22,950
D.A.T.E. 1987/88 \$ 2,200

D.A.T.E PROGRAM REPORT 1986

Objectives: To determine the most appropriate methods of renovating pastures that have become sod-bound after numerous years of use.

Summary: A 75 acre parcel of sod-bound pasture at the W/M Community Pasture that had not been renovated for 15 years was divided into 12 equally-sized plots. Eleven treatment methods were used to renovate the pasture with the remaining work being done in the spring and summer of 1985. All plots, except the check plot, received the same amount of seed and fertilizer.

Due to the extreme drought in the summer of 1985, a number of plots showed limited germination. To prevent weed infestation on the poorly germinated plots, seven plots were rediscd and seeded in the summer of 1986.

Production data will be gathered in the coming year and even though the significance of the treatment method with that of the production data cannot be properly correlated, the initial costs of renovation for the various methods are still valid.

The treatment methods and their associated costs have been summarized in the following table. Seed costs of \$18.05 per acre and fertilizer costs of \$28.18 per acre have not been included; however, the associated application costs are included in the summary costs.

PLOT NO.	TREATMENT METHODS	TOTAL COST/ACRE
I	Fall plow and disc Spring disc and seed	\$ 62.67
II	Herbicide treatment plus B.C.M.A.F. Range Seeding Equipment	131.25
III	Fall plow Spring rotovate and seed	76.90
IV	Fall two-pass breaking disc Spring double disc and seed	64.31
V	Spring plow and disc Summer disc and seed	76.71
VI	Spring two-pass breaking disc Summer disc and seed with B.C.M.A.F. Range Seeding equipment	88.04
VII	Spring rotovate, plow, disc and seed	100.95
VIII	Herbicide treatment plus seed with Melroe zero-till drill	84.04
IX	Fall plow Spring disc and seed	53.80
X	Herbicide treatment plus seed with Pioneer hoe drill	90.63
XI	Check plot and Fertilizer trials	0.00
XII	Fall double aerate (all) Spring double aerate and seed (1/2) Spring single aerate and seed (1/2)	31.06 (24.00)

KIWIFRUIT PRODUCTION



Rod Chilton, Technician preparing the plants for winter
at Wernicke planting in Langley

Project Number: 181

Supervision: Brent Warner, Horticulturist, Sidney

Co-operators: Nick Pyke, D.S.I.R. New Zealand
Chaim Kempler, Agriculture Canada, Saanichton
Rod Chilton, contract employee, Vantreight Farms Ltd.
Doney Farms Ltd., and Blueberry Hill Farms Ltd.

Branches: Regional Extension Services, South Coastal

Funding: D.A.T.E. 1986-87 \$11,500
Agriculture Canada, N.C.D.F. 1986-87 \$1,290

Objectives: To demonstrate the potential of kiwifruit as a
horticultural crop for South Coastal British Columbia.

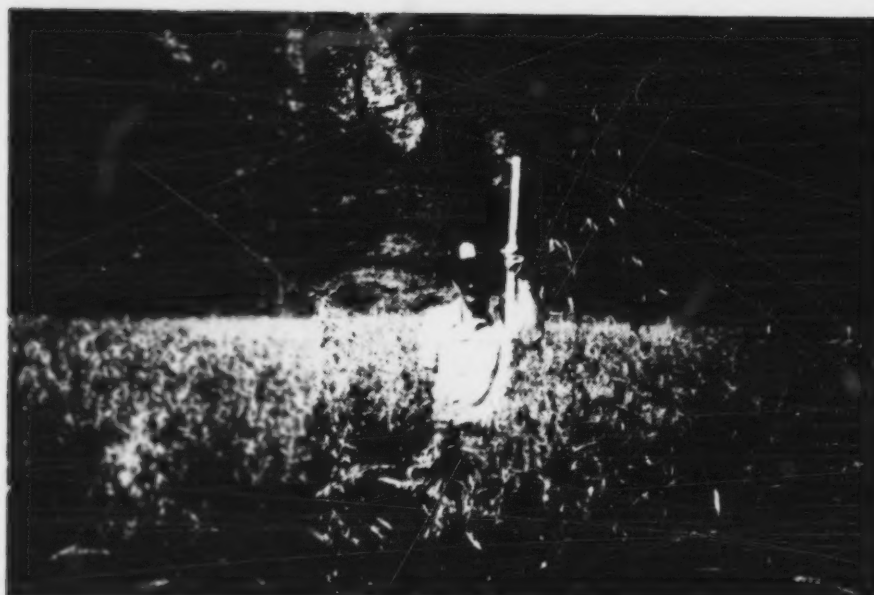
Summary:

The winter of 1985-86 was the earliest and coldest on record for the past 30 years and caused severe damage to many of the original kiwifruit plantings. The Wernicke planting (10 acres) at Langley was killed to the ground level. Most of the plantings on the Island survived, but the amount of damage ranged from severe to less than 5%. The Vantreight planting on the Saanich Peninsula (five acres), survived with less than 5% of the plants showing any effects. The Doney planting (one acre), lost 10% of the plants but the rest of the planting survived with very little damage even on young plants and the crop will be harvested around October 25th. Approximately 1,000 pounds of fruit will be used for a multitude of storage and pollination tests.

The spring of 1986 saw more interest in kiwifruit growing and a further 13 acres were planted on Vancouver Island. An additional 18 acres were planted on the lower mainland this year as well as two acres being planted in greenhouses in the Abbotsford and Maple Ridge areas.

During the fall of 1987, barring another unusually cold winter, the first Canadian kiwifruit should be available. Much of the credit for establishment and methods of protecting these plants from our cold winters, goes to Nick Pyke, who is working at the Agriculture Canada station at Sidney along with B.C.M.A.F. staff. His one year work term in Canada was jointly sponsored by D.S.I.R., New Zealand, B.C.M.A.F. (D.A.T.E. 181) and Agriculture Canada.

EVALUATION OF HIGH ENERGY FORAGES FOR INTENSIFYING
LIVESTOCK PRODUCTION IN THE OKANAGAN-KOOTENAY REGION



Grain Silage For A High Energy Forage Crop

Project Number: 183

Supervision: M. Soder, Agriculturist, Oliver

Co-operators: Thomas Ranches Ltd., Okanagan Falls
Steeple's Ranch, Cranbrook
G. Tegart, Field Crops Specialist, RES, Creston
M. Malmberg, District Agriculturist, RES Cranbrook
M. Quigley, Technician, RES, Vernon
Soil, Feed and Tissue Testing Laboratory, BCMAF, Kelowna

Branches: Regional Extension Service, Okanagan-Kootenay;
Soils Branch

Funding: D.A.T.E. 1984-85 \$16,099
D.A.T.E. 1985-86 \$11,500
D.A.T.E. 1986-87 \$ 8,900

D.A.T.E. PROGRAM REPORT 1986

Objectives: To evaluate the adaptability of high energy forage crops in the Okanagan-Kootenay region as a means of reducing reliance on imported barley and getting more value per acre from forage producing land.

Summary: Beef growing and finishing in the region is highly dependable on barley or other grains as an energy source. The most readily available source of feed grains is Alberta. High transportation costs on grain from Alberta is a significant constraint in attaining a competitive position with Alberta cattle feeders.

Alfalfa and other grasses and legumes which are widely grown are deficient in energy for rapid growth of beef cattle. Corn silage, which is an ideal feed for growing beef cattle, is limited by climate and by the specialized equipment necessary for growing and harvesting.

Cereal grains offer a similar potential to corn silage for growing and finishing cattle and are adaptable over the range of climates in the region. Identification of several crops that are adaptable to the region will improve economic opportunities for beef feeding and land use.

After one year of testing, it became evident that it was necessary to test a wider range of crops. In 1986, 26 barley varieties, 8 oat varieties and 14 wheat and triticale varieties were screened. Also, 13 winter wheats and winter barleys which were planted in the fall of 1985 were screened.

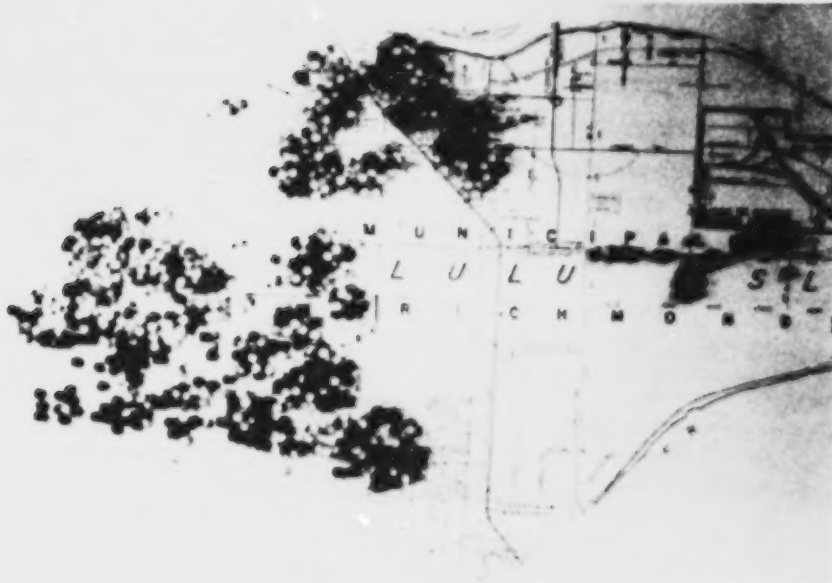
As a result of our 1986 screening tests, several varieties of wheat, oats, barley and triticale showed significantly greater promise than those previously tested. Disease assessments were also carried out on varieties with some significant differences apparent which were reflected to a high degree in the yields. Further replicated trials will be planted in 1987 to verify our results and to make general recommendations to farmers and ranchers throughout the region.

Additionally, further work will be carried out on row spacing and other cultural techniques for growing some of the new high yielding cereal varieties. Work will also continue with annual ryegrasses, rape, turnip and kale for fall grazing as well as double cropping.

A field day was held only at the Okanagan Falls site this year. In 1987, field days are planned for both Okanagan Falls and Cranbrook.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

CONTROL OF PEAR TRELLIS RUST IN RICHMOND, B.C.



Pin Colours Represent Pear Trees With Different Levels of Infection

Project Number: 184

Supervision: D.J. Osmrod, Plant Pathologist, Cloverdale

Co-operators: J. Hesketh and G. Lewis, Project Employees; Agriculture
Canada, Plant Health Division; Municipality of Richmond;
B.C. Nursery Trades Association.

Branches: Crop Protection

Funding: D.A.T.E. 1986-87 \$8,500
Agriculture Canada 1986-87 \$8,000
B.C.N.T.A. and co-operating nurseries 1986-87 \$5,800
Fraserview Mennonite Brethren Church \$1,500

D.A.T.E. PROGRAM REPORT 1986

Objectives: Approximately 200,000 junipers valued at \$1 million are currently grown in Richmond nurseries. Half of these are produced for export out of British Columbia but that is allowed only if they are certified free of pear trellis rust. To satisfy this requirement and to prevent spread of the disease in Richmond, this project was designed to remove and destroy pear trellis rust infected junipers; to determine the progress which can be made in an area-wide cleanup program utilizing two students for four months in two successive growing seasons; and to determine the cost-effectiveness of such a program.

Summary: During the 1985 growing season, 138 infected junipers were destroyed mainly in the "old" areas of Richmond where inspections had been carried out previously. In addition, pear inspections were carried out for the first time in "new" areas.

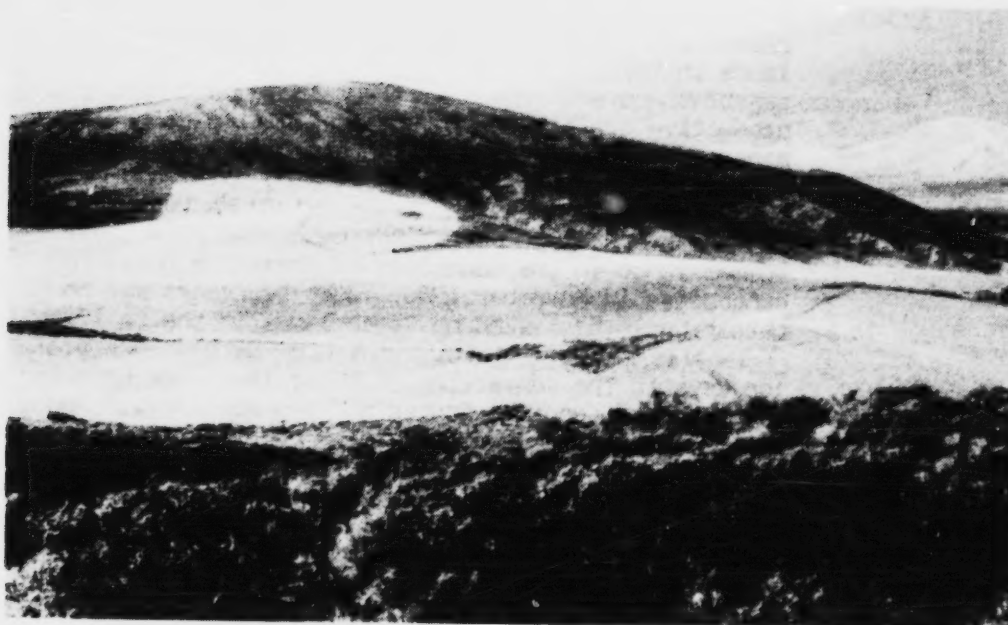
In 1986, the pear infection data from both "old" and "new" areas was used to search out infected junipers. Approximately 470 junipers were removed and destroyed. Again in 1986 pear inspections were carried out in "new" areas and two fairly small infected areas were found. In total, there are 65 addresses with more than 25 pear leaf infections. To fully exploit the information collected to date, these areas must be checked for juniper infection in 1987.

It is apparent that two years was not adequate to achieve substantial progress in Richmond. Five years would be a more realistic term. Two workers appear to be adequate to handle the inspection work but not the removal and replacement of infected junipers. Additional funding must be found to pay for the re-landscaping which must be carried out on the larger jobs. The students do not have the equipment required to do all the work themselves. Industry wide support in which all nurseries in the coastal area make contributions in proportion to their juniper production will be required to put a program like this on a self-sufficiency basis.

The cost of the program of this scale represents about 2% of the value of junipers being grown or about 6% of the annual gross sales.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

RANGE DEMONSTRATION UNIT - CACHE CREEK



Overview of Demonstration Area

Project Number: 190

Supervision: A.H. Bawtree, Provincial Range Specialist, Kamloops
L. Brown, Agricultural Engineering Technologist, Kamloops

Co-operators: Ministry of Forests and Lands, Kamloops District
John Schalles, Rancher
A.N. Isfeld, Regional Director

Branches: Field and Special Crops Branch, Engineering, Regional
Extension Services

Funding: D.A.T.E. 1984-85 \$ 7,632
D.A.T.E. 1985-86 \$34,550
D.A.T.E. 1986-87 \$ 9,000

D.A.T.E PROGRAM REPORT 1986

Objectives: To demonstrate economic improvement and management of rangeland.

Summary: Travellers through the Thompson River Valley are generally impressed with the dryness of the climate and abundance of sagebrush. With the application of new technology the grey sagebrush is giving way to the soft greens and yellows of grass. Beef cattle now graze these lands in fall, winter and spring. The former sagebrush-covered range will remain as permanently productive grassland with the application of new range management techniques. Where formerly thousands of acres were unusable due to lack of drinking water and grass, these same lands now support a cow on one to three acres per month. Over 300 beef cows descended from their summer range in the mountains to graze the nutritious bunchgrass in November 1986. Just two years ago no cattle could be grazed on these lands in the fall.

The keys to the conversion of these lands are drinking water, grass seeding, fences and cooperation. A muddy spring was excavated to provide a constant flow of two to three gallons of clean water per minute. Unique steel tanks with vinyl liners were constructed to store the limited water. A diesel motor, water pump, and several miles of polyethylene pipe were used to distribute the water to all corners of the range. 1100 acres of sagebrush was mechanically removed and replaced with nutritious, drought-tolerant bunchgrass. Fences were built to ensure proper use of the grass and to maintain its permanent productivity. The least costly but most essential part of the project has been cooperation.

Many new technological advances have been combined in the development phase of this project. However, the story will continue to unfold as new information is collected, new techniques are demonstrated, and more range managers see what can be accomplished. Another D.A.T.E. project was started at this site in 1986 to demonstrate the potential of sun and wind as alternative energy sources for such uses as pumping water and electrifying fences.

IDENTIFYING MAJOR FACTORS THAT AFFECT SILAGE QUALITY

Project Number: 192

Supervision: Peter Jones, District Agriculturist, B.C. Ministry
of Agriculture and Fisheries, Courtenay

Co-operators: Beaver Meadow Farms Ltd., Anderton Road, Comox, B.C.

Funding: D.A.T.E. 1986-87 \$1,883

- Objectives:
1. To determine the effects of different cutting dates on the quality and quantity of silage produced over one season (5-6 cuts).
 2. Clearly identify the morphological stages of grass that will produce high quality silage.

Summary: Results

YIELD -

1. The average total annual DM yield from 6 cuts was similar to those from the 5 cut fields at approximately 7 ton/acre

- 6 cuts, with average cutting interval of 28 days = 15,267/kilo/hectare.
- 5 cuts, with average cutting interval of 32 days = 14,870 kilo/hectare.
- 5 cuts, with average cutting interval of 36 days = 15,713 kilo/hectare

2. The age of the fields, 3 and 7 years had no apparent effect on these yields.

PROTEIN-

The average per cent protein of the forage and the total yield from both fields were

- 19.15% on the 28 day interval herbage (6 cuts) 2921 kilo/hectare.
- 19.4% on the 32 day interval herbage (5 cuts) 2848 kilo/hectare.
- 17.25% on the 36 day interval herbage (5 cuts) 2695 kilo/hectare.

ENERGY -

The average per cent TDN of the forage and the total yields from both fields were

- 67% on the 28 day interval herbage (6 cuts) 10,327 kilo/hectare.
- 65% on the 32 day interval herbage (5 cuts) 9,721 kilo/hectare.
- 63% on the 36 day interval herbage (5 cuts) 10,251 kilo/hectare.

Before deciding which type of management would produce the most economic feed, the production costs of the different systems should be considered.

PRODUCTION COSTS -

The total cost of producing three different quality silages were as follows:

28 day cutting interval - 6 cuts	\$122.00/ton
32 day cutting interval - 5 cuts	\$118.00/ton
36 day cutting interval - 5 cuts	\$111.00/ton

The non cash costs included in these figures were forage establishment, depreciation and investment in land, buildings and equipment.

CONCLUSIONS -

The timing of the first cut and subsequent cuts determines yield, quality and cost of that feed to a very large extent. Unfortunately, there is no easily identifiable stage of the forage which indicates this "optimum" time.

The proportion of leaf to stem of the forage was no help in deciding when to cut because all subsequent growth, after the first cut, contained grasses at all stages of development.

The corn heat units showed a good correlation with growth and quality for the first part of the season and this aspect is worthy of further study.

This trial was highly successful in identifying basic problems all silage producers face in their search for producing quality feed. It was not so successful in solving these problems within the one growing season.

EFFECT OF MATURITY OF FORAGE QUALITY AND QUANTITY

Project Number: 193

Supervision: Garth Elgie, District Agriculturist, Prince George.

Co-operators: Ken Watson, beef grower
Francis Zingle, beef grower
Ed Woolrich, beef grower
Klaas Broersma, Agriculture Canada

Branches: Regional Extension Services, Central/Peace Region
Field Crops Branch, Central/Peace Region

Funding: D.A.T.E. 1985-86 \$10,200
D.A.T.E. 1986-87 \$ 9,000
Agriculture Canada \$500

Objectives: To determine the change in forage quality and quantity on a weekly basis over the growing season and to correlate these changes to environmental factors and the growth patterns of the forage.

Summary: Dr. Ralph McQueen, Agriculture Canada, Fredericton, initiated a hay forecast (quality and yield changes on a weekly basis) in Atlantic Canada. A model has been developed from this data to predict optimum cutting time for hay based on forage species and environmental factors. It would be desirable to have a similar model for Central B.C.

The project has just completed year 2 of a 3-year funded project. Five forage mixes and 8 varieties of legumes and grasses are clipped weekly. Clippings are measured for yields and chemically analyzed in the Agriculture Canada laboratory located in Prince George. Second cuts are taken on sites where significant regrowth has occurred.

Results of the analysis are released to the media within five days of clipping. The farming community has the information in a very short time to assist in making harvesting decisions on their crops. Over a period of weeks, trends in the quality of the forages become apparent and when correlated to the stage of maturity an assessment can be made on whether to harvest. The plots are cut for 10 consecutive weeks during the growing season.

TECHNOLOGY TRANSFER - GRAPE PRODUCTION



Dr. Richard Smart

Project Number: 194

Supervision: John Vielvoye, Grape Specialist, Kelowna

Co-operators: Association of British Columbia Grape Growers

Branch: Regional Extension Services - Okanagan-Kootenay

Funding: D.A.T.E. 1986-87 50% up to \$1,000
Association of B.C. Grape Growers 50% up to \$1,000

Objective: Update the B.C. Grape Industry - via lectures and tours
- in grape trellis and training systems.

Summary: Dr. Richard Smart, world leader in grape training and trellising, toured Okanagan vineyards and presented two lectures to grape producers August 25-27 1986. His critical evaluation of British Columbia grape production system will lead to modifications that will improve grape quality, reduce production costs, and improve vineyard management.

MICRO CLIMATE AND NUTRITIONAL REQUIREMENTS OF COMMERCIAL GINSENG PRODUCTION



Dr. W.G. Bailey, Dr. Bill Van Lierop, & Al Oliver (L-R)
Examining Zinc Deficiency Trial Plot

Project No.: 196

Supervision: Al Oliver, Horticulturist, Kamloops

Co-operators: Dr. W.G. Bailey, Simon Fraser University
John Latta, Chai-Na-Ta Ginseng Products Ltd.
Al Oliver, B.C. Ministry of Agriculture and Fisheries
Dr. Bill Van Lierop, B.C. Ministry of Agriculture and Fisheries.

Branches: Regional Extension Service, Kamloops-Cariboo
Soils Branch, Okanagan-Kootenay
Crop Protection Branch, Cloverdale

Funding: D.A.T.E. 1986-87 \$6,279

D.A.T.E. PROGRAM REPORT 1986

Objectives: To determine the cultural strategies for the production of American ginseng in B.C. with specific references to micro-climate control, nutritional requirements and disease and insect problems.

Summary This is the second year of this 2 year D.A.T.E. project. Information continues to be gathered on the cultural requirements for this crop in the interior of B.C. The following are areas where information was gathered or determined that more input is needed.

It has been established that the interveinal chlorosis observed in many areas on the farm are in fact a zinc deficiency. Recommendations will be made. A soil incorporation and/or a foliar spray programme will be established.

With the amount and duration of solar irradiance at Lytton, there is a possibility of increasing the amount of solar irradiance reduction by the shade cloth from 78% to 90%. Samples of various weaves will be incorporated for testing during 1987.

Apparent roundup damage has been observed on ginseng plants in close proximity to weeds that were treated with a wipe-on application. This was applied before ginseng emergence, so the damage suggests: (1) direct root transmittance, or (2) an uptake of the herbicide from decaying root mass following weed death.

The weed dodder is a small problem but not as severe as in 1985. This may be due to (1) the climatic conditions are not as favorable, (2) the ginseng plant may only be a mild stimulant for dodder seed germination, or (3) the weeding crew is more aware and is eliminating it earlier and more efficiently.

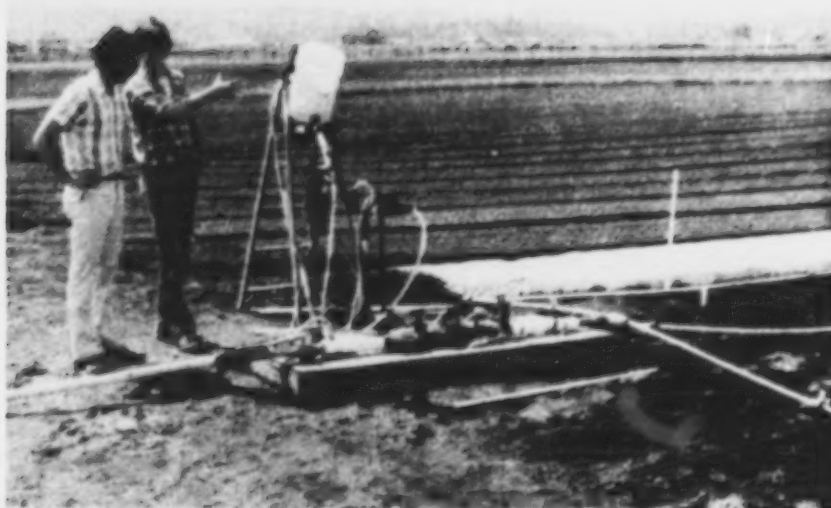
A series of tissue samples were taken from high quality plants. An optimum level for nutrients in leaf tissue will be established from this. To be able to recommend proper fertilizer levels, with a soil or leaf tissue analysis is the ultimate goal.

A trial plot is being established at Kelowna where the Soils Lab can do controlled nutrient studies. The Chai-Na-Ta company and the supplier of shade cloth have cooperated with us and have supplied much of the hardware, seed and/or plants needed.

Again as last year, virtually no insect problems were observed with this crop. A preventative programme for disease (fungal) is being carried out and no significant problems are occurring to date.

A data sheet will be produced this fall for the culture of American ginseng in the interior of B.C. With the first harvest of the crop in B.C. this fall (1986) a fairly comprehensive data sheet will be issued for the use of other potential growers.

ONION DISEASES IN THE SOUTH COASTAL REGION



David Van der Gulik explaining operation of Vapam injector to Mark Sweeney.

Project Number: 197

Supervisor: D.J. Ormrod, Plant Pathologist, Cloverdale

Co-operators: David Van der Gulik, Project Employee, B.C. Coast
Vegetable Co-operative
Eric Littley, Simon Fraser University
East Chilliwack Co-op
Cloverdale Produce Farm
Gordon's Produce
Stetar Farms

Branches: Crop Protection

Funding: D.A.T.E. 1986-87 \$3,500
B.C. Coast Vegetable Co-op 1986-87 \$5,000

Objectives: To design and build a small plot, portable irrigation system for use in disease control trials. To evaluate various methods of disease control for pink root, downy mildew, blast, purple blotch, and white rot.

Summary: A small plot portable irrigation system capable of both high and low volume water application was designed and built and the cost of \$2,300 was shared equally by the Cloverdale area onion and carrot growers. During the growing season, it was used to apply Vapam fumigant to onion pink root plots; high volumes of water to carrot cavity spot and celery yellows plots; and low volume mists to the onion foliar disease and parsnip canker plots.

The onion foliar disease trials were carried out on three farms in the Cloverdale area. Results were inconsistent but with some indication that Ridomil MZ continues to be effective for downy mildew while Bravo gives best control of blast. All chemical treatments for white rot control were ineffective but the variety comparisons showed "Eskimo" continuing to show promise while Norstar, previously thought to have resistance, was heavily infected. The pink root plots were harvested and placed in dry storage for evaluation over the 1986/87 winter.

CAUSE AND CONTROL OF PARSNIP CANKER



Severly Cankered Parsnip

- Project Number: 198
- Supervision: Mark Sweeney, Processing Vegetable Specialist, Abbotsford
Dave Ormrod, Plant Pathologist, Cloverdale
- Co-operators: Iris Bitterlich, Project contractor
Dr. R. Copeman, Plant Pathologist, U.B.C.
Bruce Wisbey, parsnip grower
- Branches: Regional Extension Services, South Coastal Region
Crop Protection Branch
- Funding: D.A.T.E. 1985-86 \$3,500
D.A.T.E. 1986-87 \$2,500
- Objectives: To determine the cause of parsnip canker and related disorders and to determine if high rates of lime, various fungicide treatments and/or resistant varieties can provide control.

Summary:

Parsnip canker is a fungal disease characterized by dark, sunken lesions which form mostly on the shoulders of the tap root. Infected parsnips are unmarketable. Canker and other related disorders can cause severe marketable yield reductions and are major limiting factors to the expansion of B.C. parsnip production.

Parsnips were seeded in May 1985 and 1986 in a field with a history of canker. Treatments consisted of a preplant application of 7 tonnes/acre of ground limestone and the fungicides Bravo, Benlate, Manzate, Difolatan, fixed copper and Captan applied at two week intervals through August and September. In addition, ten varieties were evaluated for canker resistance and commercial suitability.

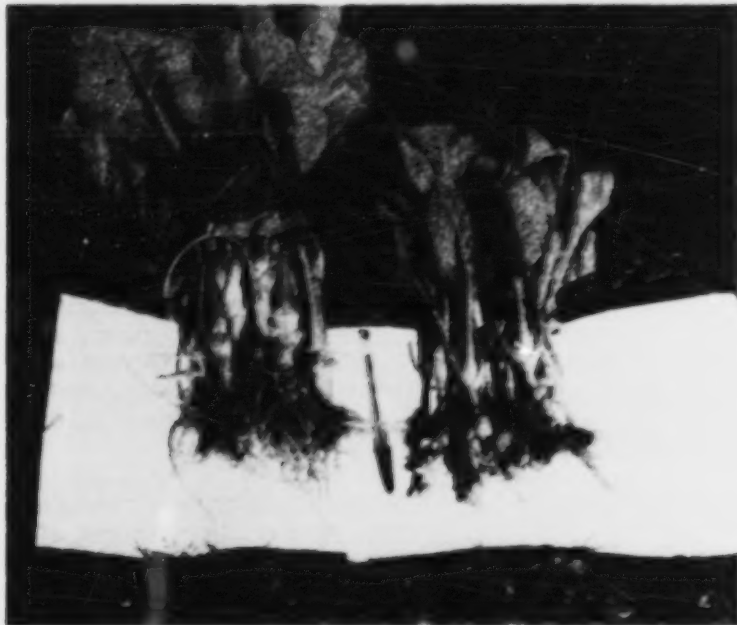
The very dry summer of 1985 kept the disease at a low level. Data from the fall 1985 harvest showed no differences between treatments. The remaining portion of the trial was overwintered in the ground, as is common commercial practice, and a second harvest was taken in the spring. Canker injury to the roots had greatly increased over the winter. Some dramatic differences between treatments were noted:

- . Fungicide application significantly reduced the severity of canker. Bravo was the most effective treatment with 9% of roots severely infected compared to 21% severely infected for the control.
- . The standard commercial variety, Harris Model, was among the most susceptible - 24% of the roots were severely infected with canker. Newer varieties, Gladiator and White Spear showed only 6% and 3% severe canker infection respectively and, in addition, were of good commercial type.
- . Preplant lime application had no effect in reducing severity of canker.

The 1986 planting will be harvested and evaluated in late fall 1986 and early spring 1987.

These initial results suggest that this disease can be greatly reduced through the use of tolerant varieties and a fall fungicide spray program.

FUMIGATION OF COLE CROP SEEDBEDS



Fumigation with Methyl Bromide (plants on left) provided excellent clubroot control compared with the control (right).

Project Number: 199

Supervision: M. Sweeney, Processing Vegetable Specialist, Abbotsford
D.J. Ormrod, Plant Pathologist, Cloverdale

Co-operators: Iris Bitterlich, Project contractor
Dr. H.S. Pepin, Plant Pathologist, Agriculture Canada,
Vancouver Research Station

Branches: Regional Extension Services, South Coastal Region
Crop Protection Branch

D.A.T.E. PROGRAM REPORT 1986

Funding: D.A.T.E. 1985-86 \$3,900
D.A.T.E. 1986-87 \$3,700

Objectives: To evaluate several materials and methods of cole crop seedbed fumigation for control of clubroot, seedling weeds and other diseases.

Summary: The fungus disease, clubroot, is responsible for heavy losses each year for Fraser Valley cole crop growers. It continues to spread to new fields often through the use of infected transplants.

Fumigation of seedbeds is a method of ensuring that transplants are clubroot-free. Other benefits of fumigation include control of seedling weeds and other diseases such as damping-off. Growers have been slow to adopt the standard methyl bromide treatment due to high cost and the very specialized application procedure. In this year of the project, the safer, more inexpensive and easier to apply chemicals Vapam and Basamid, were compared with methyl bromide.

Treatments were applied in spring 1986 to a clubroot infested sandy loam soil. Basamid, a granular, was broadcast at 400 kg/ha, rotovated in and sealed with a plastic tarp at 550 kg/ha. Vapam was applied at 500 L/ha and 750 L/ha as a dilute drench in 2.5 cm of water. Half of the Vapam plots were tarped after application. Tarps were removed two weeks after application and plots were aerated. Cauliflower was seeded on June 12, 1986.

The methyl bromide and Basamid treatments completely eradicated clubroot. The Vapam treatments significantly reduced, but did not eradicate, the disease. Seedling weed control was good for all treatments with the exception of the low rate of Vapam.

After two years of work, it is apparent that Basamid is the most acceptable alternative to methyl bromide for control of clubroot in cole crop seedbeds. Vorlex and Vapam were less suitable. Vorlex (evaluated in 1985) controls clubroot well, but is impractical in most situations due to the long required waiting period between application and seeding. Vapam did not provide adequate clubroot control.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

INTENSIVE APPLE PLANTING DEMONSTRATION PROJECT

Project Number: 200

Supervision: M. Sanders, Provincial Tree Fruit Specialist, Kelowna
Dr. H. Quamme, Pomologist, Agriculture Canada, Summerland
N. Filopenko, Naramata Co-operative, Naramata

Co-operators: Mr. Ted Ritchie Orchardist,

Branches: Regional Extension Service, Okanagan-Kootenay
Economics branch

Funding: D.A.T.E 1986-87 \$4,350
New Crop Development Fund \$8,700
Mr. Ted Ritchie \$4,350

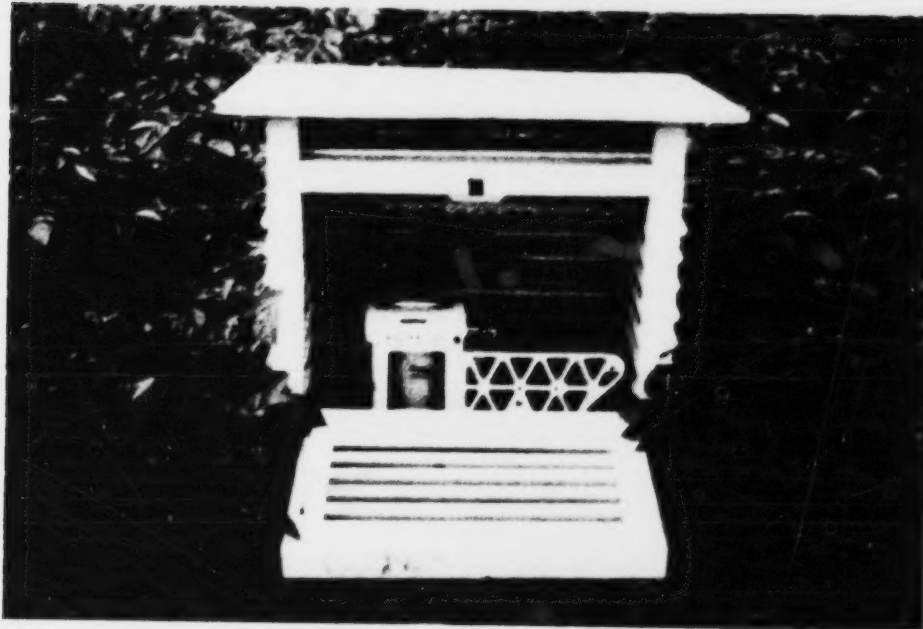
Objectives: To demonstrate four apple training systems in a
commercial orchard using McIntosh, a commercial
cultivar. The systems chosen are U.S.D.A. Central
Leader, Van Roechoudt Trellis, Central Axe, and Slender
Spindle. Rootstocks to be used are M 9 M 26.

An annual economic analysis will be prepared by
George Geldart, B.C.M.A.F., showing total costs and
returns for each combination under trial.

Summary: Due to the availability of trees on the appropriate
rootstocks, this plot will not be planted until spring
1987. Land preparation has commenced, posts and wires
have been ordered and deposits for trees have been made.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

DEVELOPMENT AND IMPLEMENTATION OF POTATO INTEGRATED
PEST MANAGEMENT



Equipment Used To Measure Relative Humidity And Temperature For
Potato Late Blight Forecasting.

Project Number: 201

Supervision: Andrea J. Buonassis, Plant Pathologist, Cloverdale

Co-operators: Dr. B. Vernon, Entomologist, Agriculture Canada
Eric Urquhart, Contract Researcher

Branches: Crop Protection

Funding: D.A.T.E. 1986/87 \$8,100

Objective: To promote the commercial adoption of potato integrated
pest management (IPM) in the Fraser Valley through the
demonstration of disease (late blight) and insect (tuber
flea beetle and aphid) monitoring program.

D.A.T.E. PROGRAM REPORT 1986

Summary:

A two year D.A.T.E. project to demonstrate potato integrated pest management (IPM) was successfully concluded in October 1986. Potato crops at six sites in the Fraser Valley were closely monitored throughout the growing season. Growers were alerted when disease or insect pests threatened and a pesticidal spray was necessary. The dry 1986 growing season resulted in fewer spray recommendations and savings in the cost of spraying to the six participating growers. Taped disease forecast information was available to other growers through an agri code-a-phone line. Growers saved from two to four sprays for blight control and two growers did not have to spray for insect control.

Potato growers now have the information they need to accurately time pesticidal sprays for effective disease and insect control. Acceptance of the IPM program by the potato growers was very high. In 1986 potato IPM will be a co-operative project run by the B.C. Ministry of Agriculture and Fisheries and Agriculture Canada.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

FRANCOIS LAKE ROTATIONAL GRAZING AND FALL PASTURE

Project Number: 202

Supervision: Graeme Johnstone, District Agriculturist, Smithers

Co-operators: Gordon McFee, Francois Lake
Bob Fowler, B.C. Ministry of Forests, Burns Lake
Jim Tingle, Field & Special Crops Branch, B.C. Ministry
of Agriculture and Fisheries, Prince George
Graeme Johnstone, Regional Extension Service,
Central/Peace River Region

Branches: Regional Extension Service, Field and Special Crops Branch

Funding: D.A.T.E. 1985-86 \$3,700

Objectives: To demonstrate pasture management techniques and electric
smooth wire fencing.

To evaluate alternative pasture forages to extend the
local grazing season.

To evaluate a rotational grazing system on tame pastures
in relation to native ranges.

Summary: Twenty-six beef cows and calves were turned into the
first four pens on a six year old stand after fertilizing
with 34-0-0, 100 pounds, on May 27 after weighing.

Rotating on a biweekly basis and weighing on July 7, the
use of electrified high tensile three strand fencing
proved effective.

Due to very little fall rain in 1985 and very little snow
in the 1985/86 winter, the ground remained dry with no
spring precipitation until mid-June when 46mm fell in 24
hours.

By mid-July, the pasture ran out and the twenty-six head
and calves joined the rest of the herd on range.

There was no significant difference in average daily gain.

Italian ryegrass was undersown under silage grain and
after a fall rain provided a good source of feed. The
operator will continue to use this method for fall
grazing.

The grazing area had to be ploughed in 1986 fall so the project is terminated with the only positive result being the success of electric fencing in restraining beef cattle.

The first year showed that cattle must be trained to electric fencing before actual confinement begins. Both years showed that water supplies which seem to be more than adequate as springs, when piped to a central trough, run out very quickly.

This project was initiated in order to demonstrate whether the rotational grazing would or would not provide feed to replace range grazing. Due to inadequate moisture in many years, it would appear that grazing might be available until mid-July.

Fall crop will provide feed in September providing there is rain.

Therefore, there is a gap between mid-July and September, which is when the first frosts occur, thus reducing the feed value of bush forage.

There is the possibility that a newer seeding would provide more feed but it should also be noted that younger stands when hayed in early July do not regrow unless there is rain.

At present, cattlemen are not prepared to seed specifically for grazing. The work involved in moving cattle on a one man operation is not conducive to the idea of intensive grazing.

It should be noted that the herd use averaged 712 pounds actual weight on 140 calves on October 20. The heaviest calf was a heifer born on 15 January 1986 weighing 925 pounds.

IMPROVING B.C. FRESH STRAWBERRY MARKET SHARE



Production of large, high quality strawberries for the fresh market is possible until October using new day neutral varieties.

Project Number: 205

Supervision: W.S. Peters, Provincial Berry Specialist, Abbotsford

Co-operators: Dr. Hugh Daubeney, Agriculture Canada, Research Station
Bob Hornidge, Horticulture Technician, Abbotsford

Branches: Regional Extension Service, South Coastal Region

Funding: D.A.T.E 1985-86 \$5,000

Objectives: To determine if any of the available day neutral (everbearing) varieties of strawberries grown in other areas of North America have an improved fresh market potential over those varieties presently being grown commercially in British Columbia. If superior fresh market varieties could be identified, they would lead to increased local production of strawberries thereby decreasing imports.

Summary: This project was started in 1985 and fruit quality, yields, etc. were assessed in 1985 and 1986 along with virus disease susceptibility and winter hardiness. All plants were grown on raised beds with black plastic mulch at the Ministry's Agriculture and Fisheries Center, Abbotsford. Irrigation was provided by sprinkler irrigation.

Results of this trial prove conclusively that some of the newer day neutral strawberry varieties are vastly superior to the older everbearing varieties and that they should be commercially feasible under local conditions. All varieties survived the 1985/86 winter without serious injury.

The varieties Tribute and Tristar (U.S.D.A. Maryland) were notable for their high yields and fruit quality (firmness, colour and flavour) while Selva (U.S.D.A. California) produced a smaller crop, the berries were very large (up to 5cm in diameter) and of comparable quality.

The fruit from these three varieties appeared to be highly marketable while the yields were sufficient for economical production. Burlington fruit was generally large but rather irregular shaped and of poorer quality. Sakuma fruit was more attractive but otherwise not outstanding by comparison. Tillikum produced masses of small sized fruit, most of which would not be marketable. The older standard varieties Quinalt and Ozark Beauty produced light crops of inferior fruit in 1985 but were rogued out early in 1986 due to extreme stunting due to their susceptibility to virus diseases.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

ASIAN PEAR VARIETY DEMONSTRATION FOR COASTAL B.C.



Doug O'Brien, Technician at Sidney with original
20th Century trees

- Project Number: 206
- Supervision: Brent Warner, Horticulturist, Sidney
- Co-operators: Agriculture Canada, Saanichton, and Hallman Nurseries,
Saltspring Island
- Branches: Regional Extension Services, South Coastal
- Funding: D.A.T.E. \$ 1,000
- Objectives: To evaluate the Asian Pear varieties currently being
grown in the rest of the world as a possible new crop for
Coastal B.C.

D.A.T.E. PROGRAM REPORT 1986

Summary:

After a long struggle, budwood was finally obtained to propagate 13 varieties of Asian Pears for a test planting to the Agriculture Canada Research Station at Sidney. These trees have been propagated by Hallman Nurseries on Saltspring Island and will be planted in the fall of 1987 as one year whips. The names of the varieties being tested are as follows; Chojuro, Yakumo, Nitaka, Kosui, Seigyoku, Yali, Yongi, Nijisseiki, Shinseiki, Shinko, Seuri, Hosui and Ar-ri-rang.

In addition, trees of Chojuro and 20th Century were previously planted in 1984. These trees bore a small amount of fruit this year and should produce a substantial amount in 1987.

There has already been interest from local orchardists in this crop as well as local nurseries which are interested in propagating varieties which we feel will best suit our conditions.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

EARLY WEANING OF BEEF CALVES

Project Number: 207

Supervision: E.L. Moore, Assistant District Agriculturist, Kamloops

Co-operators: B. Donchi Ranch, Vinsulla
Sullivan Valley Stock Association

Branches: Regional Extension Service - Thompson/Cariboo

Funding: D.A.T.E. 1986-87 \$2,350

Objectives: To determine the economic potential of weaning range beef calves on to high quality irrigated pasture in late summer.

Summary: Twenty-six calves were rounded up on range and weaned onto irrigated pasture on September 9, 1986, six weeks earlier than the control group which was weaned on October 25, 1986. Each group of calves was weighed at weaning and at intervals of six weeks after weaning, with the final weights taken on December 8, 1986.

The final result, after both groups of calves had gone through the stress of weaning and had adjusted to a feedlot situation was a net gain for the early weaned steers of 76 pounds over the late weaned steers, and an advantage of 52 pounds for the early weaned heifers over the late weaned heifers (Table 1).

Table 1

	<u>Steers</u>	<u>Heifers</u>
Early Weaned	595	569
Late Weaned	519	517
Difference	76 lbs.	52 lbs.

* Early Weaning September 9, 1986
Late Weaning October 25, 1986

The additional cash costs of early weaning totalled \$10.08 per head. This cost included barley, hay and electric fencing of the pasture.

The irrigated pasture utilized by the early weaned calves may also have some additional costs in some situations, although in this operation there were no additional cash costs associated with the early use of this fall pasture.

Table 2

	Returns Over Cash Costs	Net Returns
Steers	76 lb @ .95 = \$72.20/calf - 10.08 = \$62.12	
Heifers	52 lb @ .85 = \$44.20/calf - 10.08 = \$34.12	

The net return of \$62.12 per steer calf and \$34.12 per heifer calf would appear to be quite attractive. It must be remembered that this additional return must cover any additional labor costs that you may incur with an early weaning program.

Early weaning will not fit every ranch situation, however it does point out a management technique that has the potential to significantly increase net return.

Other aspects of this study that require further investigation include the superior performance of first calf heifer's calves when weaned early, and the impact of early weaning on cow condition and subsequent performance.

MINERALS ON RANGE



Peter Falsetta with the Mineral Feeder

- Project Number: 208
- Supervision: Mr. Graham Strachan, District Agriculturist, Kamloops
- Co-operators: Mr. Gordon Garthwaite, Owner, Rey Creek Ranches
- Branches: Regional Extension Services - Thompson/Cariboo,
B.C. Ministry of Agriculture and Fisheries
Veterinary Branch and Feed and Soil Testing Laboratory
- Funding: D.A.T.E. 1986-87 \$ 2,200
- Objectives: To determine if the feeding of minerals to cows and calves on range would result in increased weight gains on the calves.

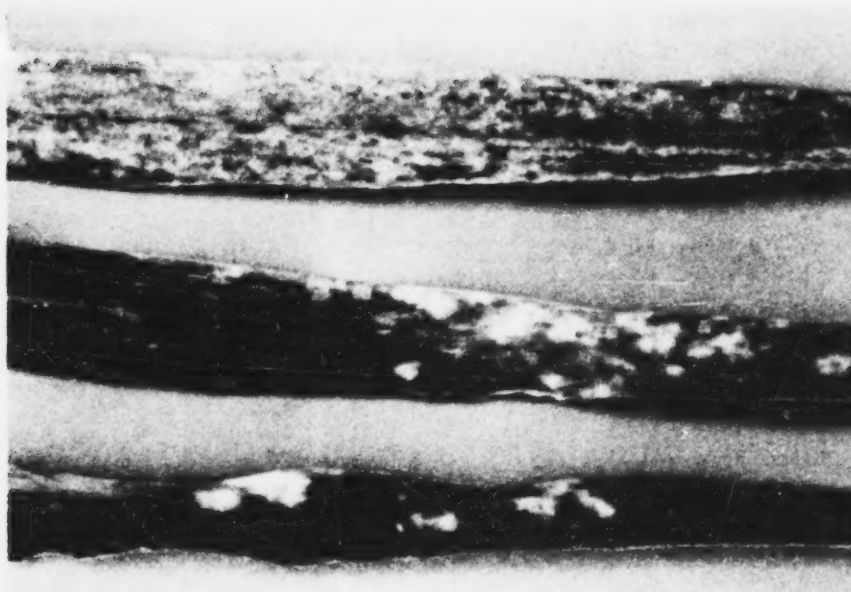
Summary:

Analysis of range forages in the Kamloops area carried out by the Agriculture Canada Research Station indicate that the levels of trace minerals are below those currently recommended for livestock. Grazing trials in Alberta where similar deficiencies exist have resulted in increased weight gains with the supplementation of copper, zinc and selenium.

The D.A.T.E. trial involved one group of cows and calves being fed a high level mineralized salt with their weight gains compared to a second group that were fed a low level mineralized salt. Calf weights and blood samples were taken in the spring and again in the fall after grazing for a period of 140 days.

Although increased weight gains were observed from the calves receiving the high level mineralized salt, the differences were not large enough to be considered significant.

INTENSIVE MANAGEMENT SYSTEMS FOR CEREALS IN SOUTH COASTAL B.C.



Powdery mildew infection on Leger barley leaves not treated with fungicide.

Project Number: 209

Supervision: M.F. Betts, Field Crop Specialist, Sidney

Co-operators: Research Station, Agriculture Canada, Sidney

Branches: Regional Extension Service, South Coastal Region

Funding: D.A.T.E 1986-87 \$1,550

Objectives: To demonstrate the use of intensive management systems developed in Europe for the production of cereal grains. These techniques could be adapted by farmers in British Columbia to dramatically increase local grain production. Substantial success has been achieved with spring sown cereals in Eastern Canada.

Summary:

Management inputs included -

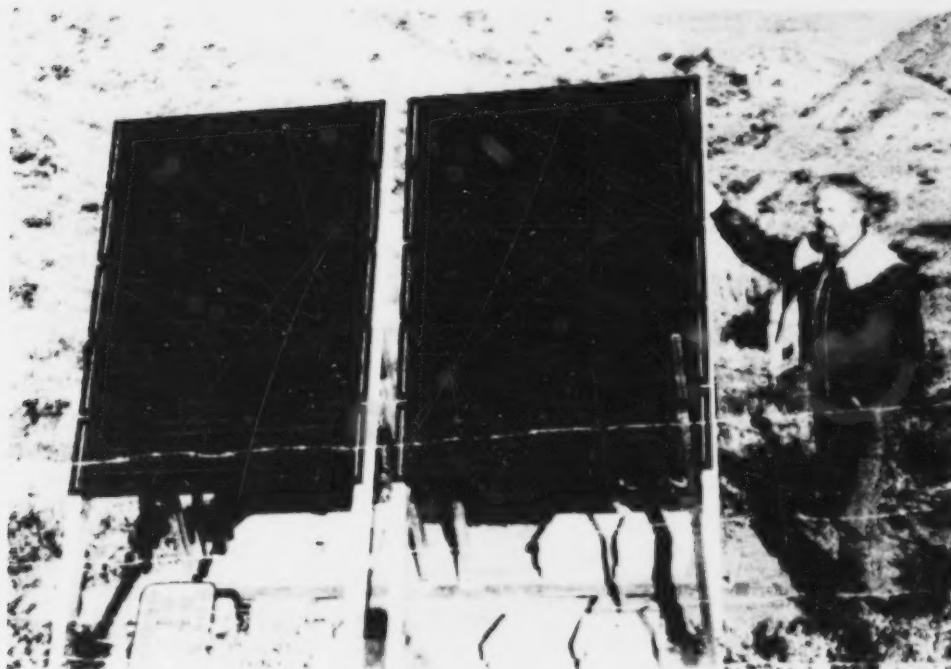
- 1) varying levels of nitrogen
- 2) growth regulators to control lodging
- 3) fungicides to control leaf and stem diseases.

The fungicides, Tilt and Bayleton, were effective in controlling powdery mildew. Severe powdery mildew infection occurred where high nitrogen levels were used and no fungicide applied.

Seed yield of barley under standard management was 6110 kg/ha whereas intensive management resulted in a yield of 7580 kg/ha; an increase of 24% or 1470 kg/ha. The growth regulators, Cerone (ethephon) and Terpal (mepiquat chloride plus ethephon) were effective for controlling lodging.

A more detailed report is available on this project.

RENEWABLE ENERGY USE IN RANGE WATER PUMPING



Photovoltaic Panels on a Range Site near Cache Creek

Project Number: 210

Supervision: L.G. Brown, Agriculture Engineering Technologist, Kamloops

Co-operators: Energy Mines and Resources Canada
Conservation and Renewable Energy Office, Vancouver
J. Schalles, Rancher, Ashcroft

Branches: Engineering
Information Services, Media Production Centre, Kelowna

Funding: D.A.T.E 1986-87 \$7,675 (implementation)
Energy Mines and Resources Canada \$24,775
(implementation, monitoring, information transfer)

Objective: To demonstrate the suitability of renewable energy in pumping livestock water on rangeland using photovoltaic technology.

Summary: This is the first phase in a possible two phase renewable energy demonstration project (wind pumping and hydraulic ram pumping are being considered as a second phase). Photovoltaic (P.V.) technology offers a simple, renewable, very portable, and long life energy supply that converts sunlight directly to D.C. electricity. Small domestic and livestock P.V. pumping systems are currently in use in Third World countries as an alternative to costly diesel or gasoline powered pumping. Although petroleum is somewhat less expensive in B.C., it is usually seen as too costly for use in range water pumping and that is not likely to change. With approximately 10 percent of B.C.'s 10 million hectares of rangeland with poor livestock water supply, an economical energy source would have a very positive impact in range development.

In August a P.V. pumping system was installed on a range demonstration site near Cache Creek (see D.A.T.E. No. 190). To ensure a practical scale and good rancher acceptance, the project was set to meet the following criteria:

- 1) supply livestock water for 100 head - this would require an average of 4000 litres per day (1000 U.S. gpd)
- 2) pump a lift of 55 metres (180 feet)
- 3) use a pump suitable for both surface water sources (i.e. springs) and ground water sources (i.e. wells)
- 4) be installed and operated under normal range use conditions.

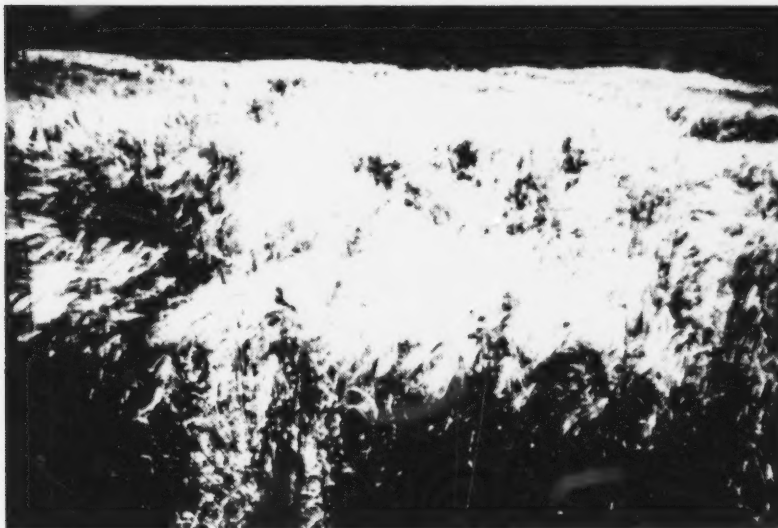
System operation from mid-August to early November has been very encouraging. Volume and life requirements were met although peak panel output appears to be less than the manufacturer's specification. Information from the monitoring data logger will be used to verify performance. This will continue into 1987 with detailed results available after one full year of operation.

With funding from Energy, Mines and Resources Canada, the B.C. Ministry of Agriculture and Fisheries Media Centre in Kelowna is making a film on all aspects of the project for use in information transfer.

Wind energy monitoring has been started on the same site to verify if conditions warrant its use. Inter-connection of solar and wind systems is being considered.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

SUPPLEMENTAL IRRIGATION IN A SHORT SEASON AREA



Irrigated Cereal Silage

Project Number: 211

Supervision: J.N. Tingle, Forage Specialist, Prince George

Co-operators: Jean and Doug Hawley, hay growers
Ted van der Gulik, Irrigation Specialist, Abbotsford
Steve Lamble, Climatologist, Ministry of Environment

Branches: Field and Special Crops
Engineering

Funding: D.A.T.E. 1986-87 \$8,475

Objective: To measure improvements in crop yield and feed quality
due to irrigation under recommended management practices
in a short season area.

D.A.T.E. PROGRAM REPORT 1986

Summary:

A test site was selected on the farm of Jean and Doug Hawley at Priestly, near Burns Lake in May, 1986. One acre each of dryland and irrigated land was plowed and prepared for seeding various crop trials including cereal silage, cereal grain, fall pasture and alfalfa varieties.

On an additional four acres each of dry and irrigated hayland the recommended fertilizer rate was compared to the Hawleys' normal fertilizer rate. The 1986 production from one cut of hay was as follows:

Hay Production in Tons per Acre

	Producer's Fertilizer Rate (53N-10P ₂ O ₅ -10K ₂ O-7S)	Recommended Fertilizer Rate (60N-32P ₂ O ₅ -20K ₂ O-28S)
Dryland	1.92	2.92
Irrigated Land	3.32	4.62

The addition of \$12.75 worth of extra fertilizer increased the hay yield by one ton per acre on dryland. The same amount of extra fertilizer produced 1.3 ton per acre extra hay on the irrigated hayland. The increase in yield caused by irrigation was 1.4 tons of hay per acre under normal fertility and 1.7 tons per acre under higher fertilizer rates.

A more detailed summary of the effects of irrigation, fertilizer rate and variety on cereal silage and grain yields and fall pasture growth has been included in the January, 1987 edition of the Central Region Farm Newsletter.

Highlights of these studies include:

- yield increases due to irrigation of 1.4 tons of hay, 3.0 to 6.0 tons of barley silage and 26 bushels of grain per acre.
- a high grain yield from the new early barley variety Jackson.
- the certainty of perennial forage establishment under irrigation.
- the excellent fall growth of Aubade annual ryegrass under irrigation.

The trials will be continued in 1987.

APPLE REPLANT SOIL TESTING AND FIELD TRIALS



Dr. John Slykhuis examining apple seedlings being used
in the apple replant soil test.

Project Number: 212

Supervision: J.M. Yorston, Plant Pathologist, Summerland

Co-operators: Denise Kitson, Project Employee
Dr. John Slykhuis, Apple Replant Testing Service
Summerland
Dr. Gerry Neilsen, Agriculture Canada, Summerland

Branches: Crop Protection Branch

Funding: D.A.T.E. 1986-87 \$10,000
ARDCORP \$12,000 to \$15,000

D.A.T.E. PROGRAM REPORT 1986

Objectives: To demonstrate the usefulness of greenhouse apple seeding tests to select appropriate soil treatment prior to replanting apple trees in old orchard land.

Summary: This project was partly designed to assist John Slykhuis so that he could provide an apple replant soil testing service to commercial apple growers in British Columbia. As of October 31, 1986, 120 samples have been received by the soil testing service.

The other objective was to set up field trials to see if the greenhouse test accurately predicts what will happen in the field. Five sites were selected and planted in the spring of 1986 using results from 150 soils tested by the BCMAF in 1985. Trees were measured at planting time and re-measured in October 1986 after growth stopped. Results from these tests have been collected, but not analyzed. Tree measurements will be taken for several years into the future.

Five orchard soils were collected and tested in the greenhouse during the summer of 1986 as part of this project. Using the greenhouse test results, three sites were selected and soil fumigant treatments were applied in October 1986. In the spring of 1987 trees will be planted in the sites and tree measurements will be recorded for several years.

THE DISTRIBUTION OF XIPHANEMA OCCIDUUM NEMATODE IN OKANAGAN
VINEYARDS



Margaret Graham and John Vielvoye Observing Nematodes Extracted
From Vineyard Soil Samples

Project Number: 213

Supervision: John Vielvoye, Provincial Grape Specialist, Kelowna

Co-operators: Dr. J. Webster - Simon Fraser University
Dr. T. Vrein - Agriculture Canada

Branches: Regional Extension Service .. Okanagan-Kootenay

Funding: D.A.T.E. 1986-87 \$2,900

Objective: To identify areas of the Okanagan-Similkameen valleys
where Xiphanema Occiduum is present.

To assess potential spread of Tomato Ringspot Virus in
vineyards - if this virus was introduced to
Okanagan/Similkameen area vineyards.

Soil samples from 290 blocks of grape vines, in 83 vineyards were collected during May and June, 1986. Samples were analysed for the presence of *Xiphanema Occiduum* nematode at Agriculture Canada facilities in Vancouver. Examples of the nematode were sent to Biosystematus Research Institute, Ottawa to confirm identification. The nematode was found in soil samples from each of the 83 farms.

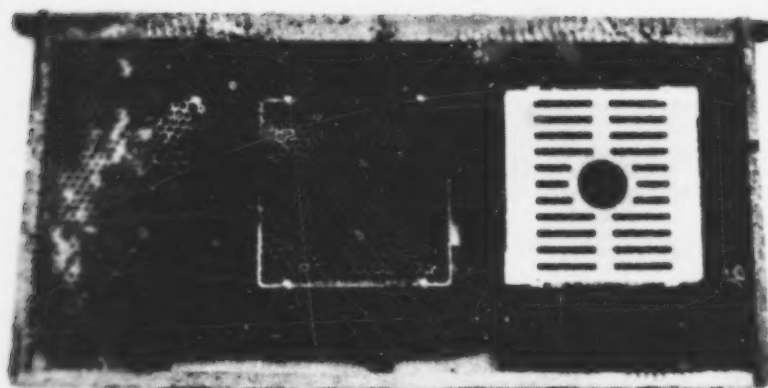
Tomato Ringspot virus was successfully transmitted from cucumber to cucumber using *Xiphanema Occiduum* collected from Okanagan vineyards.

Summary:

The widespread presence of this new species of nematode, formerly incorrectly named *Xiphanema Americanum*, and its ability to transfer T.R.S.V. suggests that the introduction of the virus to Okanagan-Similkameen area vineyards would result in spread of the virus and serious production losses in vineyards.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

TESTING A NEW DEVICE FOR HONEYBEE QUEEN REARING -
"THE JENTER QUEEN REARING COMB"



Jenter Comb Implanted Into Standard Honeybee Comb

Project Number: 215

Supervision: N. J. Gates, Apiculture Technician, B.C. Ministry of
Agriculture and Fisheries - Vernon

Co-operators: D. Lomond, Project Employee
F. Taylor, Landowner
B.C. Honey Producers' Association

Branches: Field and Special Crops - Vernon

Funding: D.A.T.E 1986-87 \$4,925.00
B.C. Honey Producers' Association
1986-87 \$ 500.00

D.A.T.E. PROGRAM REPORT 1986

Objectives: British Columbia honey producers purchase honey bee queens each year because queenbee production has been difficult by traditional grafting methods. This project will:

1. Determine if the Jenter Queen Rearing Comb can be readily used by most beekeepers.
2. Compare the Jenter Comb system to the traditional grafting system used to rear queen honeybees for:
 - a) labour time required per queen cell produced.
 - b) acceptance rate of queen cells by cell starting colonies
 - c) quality of queens produced.
3. Test the durability and ease of maintenance of the Jenter Comb system.

Summary: During May the Jenter device was assembled and introduced to a honeybee colony to have its wax cells drawn out as per purchase instructions; honeybee colonies were stimulated in preparation for queen rearing; and queen cells were produced by the Jenter Comb and standard grafting methods.

During June, large honeybee colonies were split to make small mating nucleus colonies, mature queen cells from both techniques were introduced to the nuclei and queens were allowed to mate. Mated queens were then introduced into large honeybee colonies to test supersedure rates (queen failure). During June and July, the Jenter Comb and grafting methods were tested to obtain additional data relating to labour time per queen cell produced and acceptance of queens cells in cell-producing colonies. During August, additional queens were established in small mating nuclei for overwintering trials. During August, September and October, colonies containing test queens were fed and prepared for winter.

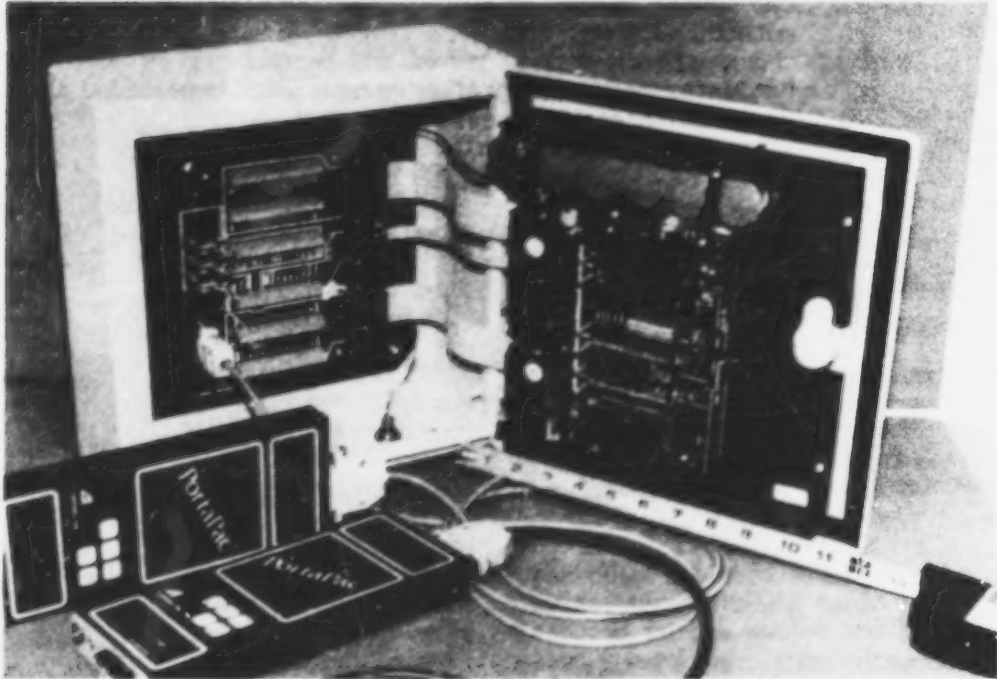
As a result of this work, a good understanding of the operation of the Jenter Comb device was gained.

Data from this year's work indicates that the Jenter device is slightly slower than grafting for transferring larvae of eggs from the comb to cell cups. However, the

transfer phase of the queen rearing operation is very small so the increase in labour time is not significant. The cell acceptance rate of transferred larvae for the Jenter method is lower than for the grafting method where larvae are grafted into primed plastic cups. 84.1% vs. 95.6%. The cell acceptance rate of transferred eggs for the Jenter method is much higher than for the grafting method. 75% vs. 20%.

No Jenter reared or grafted queens were superseded in their colonies this season.

DEMONSTRATION OF A DATA LOGGER SYSTEM TO EVALUATE GREENHOUSE
ENERGY CONSERVATION



Data Logger System Comprising DT100 Data Taker enclosed in industrial case, complete with 2 Crytronics data storage packs

Project Number: 216

Supervisor: Phil Johnson, Structures Engineer, Abbotsford

Co-operators: Brian Mauza, Greenhouse Horticulturist, Abbotsford

Funding: D.A.T.E. 1986-87 \$ 10,500

Objectives: A data logger is an electronic device used to continually measure and record temperature, or any other chosen parameter (such as humidity, pressure, strain, solar insolation, etc.) and then store the data. Data can subsequently be transferred to micro-computer to be manipulated and plotted.

It is the objective of this project to procure a suitable data logger and effectively use it to monitor the performance of energy conservation systems in greenhouses. Experiments can be designed to compare fuel consumption and heating pipe temperatures, to compare the effectiveness of energy retention systems, to compare glazing insolation properties, and to assess the effectiveness of micro-processor climate control systems and other energy conservation devices.

Summary: Starting in March, 1986 a comprehensive evaluation of low cost, portable, field data loggers was made. Criteria for selection is summarized.

- . stand alone field unit secure from moisture and dust
- . dedicated primarily to temperature monitoring using T-type thermocouples with flexibility to record analogue input voltages, currents and resistance
- . 24 differential or 48 single ended analogue input channels
- . 14 bit resolution
- . memory: 64K RAM storage. Data stored is to be transportable to micro-computer located in office
- . power supply 110V AC and/or internal power supply
- . warranted for one year with service back-up readily available.

A short list of 6 units was carefully evaluated and the final selection was a DT100 Data Taker complete with an industrial case and terminal block and 2 Crytronics 64K RAM storage units.

The system has been received as of October, 1986 and set up and experimental design is proceeding. The first greenhouse site to be used to test the capabilities of the data logger will be the B.C.M.A.F. experimental greenhouse at Abbotsford.

ROUND BALE SILAGE SYSTEMS DEMONSTRATIONS



Field demonstration of making multiple-bale silage in long bags. Round bales stored in a stack covered by plastic is shown to the left.

Project Number: 217

Supervision: Roly Kilpatrick, Agricultural Engineering, Abbotsford
Gordon Hutton, District Agriculturist, Williams Lake

Co-operators: Neil MacDonald, Rancher
Bill Stirling, Merritt

Branches: Engineering, Regional Extension Service, Thompson
Cariboo

Funding: D.A.T.E. 1986-87 \$2,000

D.A.T.E. PROGRAM REPORT 1986

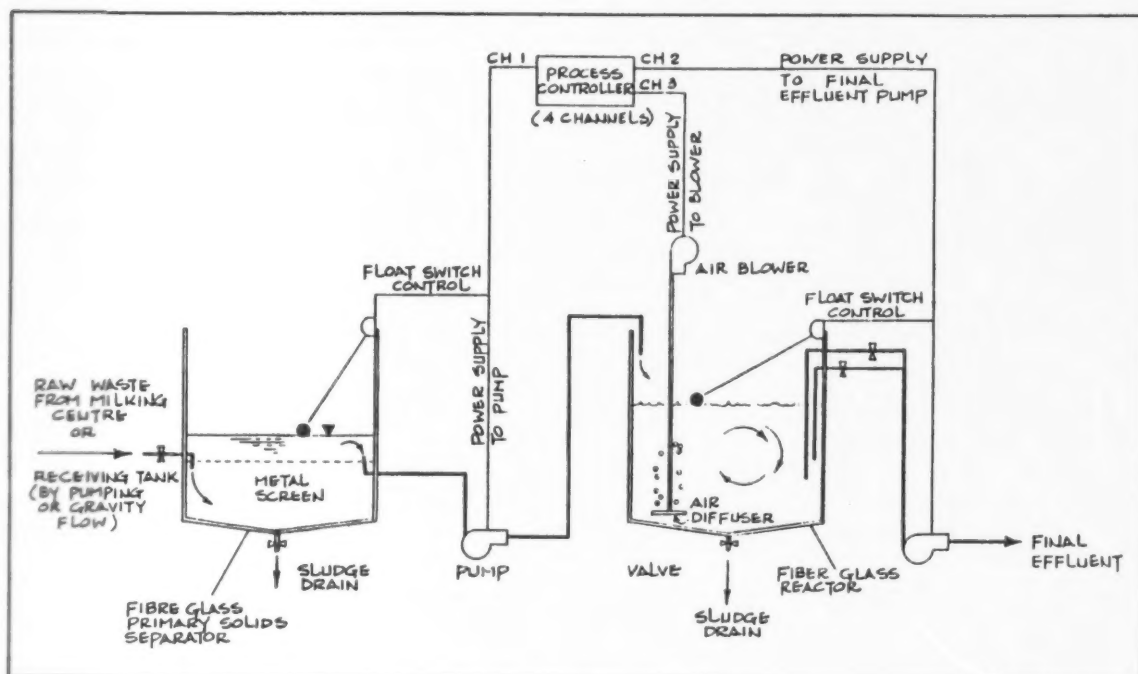
Objective: To demonstrate three different methods of making round bale silage that are currently available to B.C. ranchers.

Summary: This D.A.T.E project was initiated to demonstrate round bale silage as a means of producing high quality forage. Forage quality is a major constraint to livestock production in the Central Interior of British Columbia. The loss of forage quality is often the result of delays in forage harvesting due to weather. Round bale silage offers the flexibility to producers to put up good quality feed in weather conditions unsuitable for hay production without major changes to their haying equipment.

A field day was held to demonstrate three round bale silage-making techniques: 1) individual round bale bags, 2) multiple bale bags containing 25 round bales, 3) stacks of round bales sealed under a plastic sheet.

A summary of the three systems will be developed which will be made available to producers.

SEQUENCING BATCH REACTOR FOR TREATING
MILKING CENTRE EFFLUENT



General schematic layout of SBR Treatment Unit

Project Number: 218

Supervisor: Rick Van Kleeck, Waste Management Specialist, Abbotsford

Co-operators: Dr. Victor Lo, Department of Bio-Resources Engineering,
University of British Columbia

Branches: Engineering

Funding: D.A.T.E 1986-87 \$9,850
Department of Bio-Resources Engineering
Design Services: \$1,000
Components and Supplies \$1,000

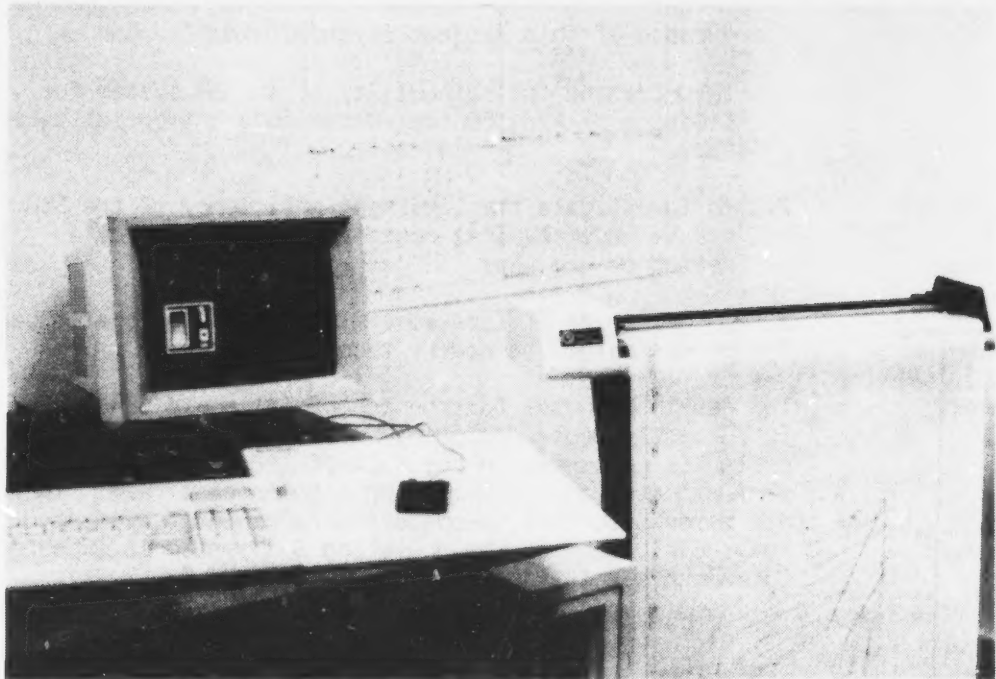
Objectives: A Sequencing Batch Reactor (SBR) is a waste water treatment system that is a high rate aeration process that affords a relatively low cost and highly effective stabilization of waste water. The technology has proven to be effective in a pilot plant demonstration at the dairy operation at U.B.C.

The purpose of this project is threefold:

1. To determine the suitability of an SBR system for treating milking centre wastes on a commercial dairy farm.
2. To investigate the treatment efficiency of the SBR system under typical operating conditions for a period of one year.
3. To determine if treated effluent from the system can be discharged to nearby receiving water.

Summary: The design proposal for the commercial scale SBR system is currently under design by Dr. Victor Lo. Once the design is completed in the fall of 1986, the system can be fabricated and installed on a commercial farm. There are three potential co-operating farms under assessment now. Evaluation of the operating SBR system is expected to commence this winter.

MICRO-COMPUTER DATA COLLETION, DESIGN AND
DRAFTING OF SUBSURFACE DRAINAGE SYSTEMS



Computer system and plotter produces a subsurface drainage plan

Project Number: 219

Supervisor: Fraser Smith, Drainage Engineer, Abbotsford

Co-operator: Steve Inglis, Inglis Farm Drainage, Victoria

Branches: Engineering

Funding: D.A.T.E 1986-87 \$2,000
Inglis Farm Drainage \$2,000

D.A.T.E. PROGRAM REPORT 1986

Objectives:

1. To demonstrate subsurface drainage design using a new micro-computer program suitable for use in the field by a drainage contractor or agricultural engineering consultant.
2. To demonstrate an integrated system of electronic data collection, data transfer, design and drafting of drainage plans.
3. To demonstrate how current technology can help reduce the overall cost and time involved in producing surface drainage plans. The use of this new technology could reduce the time spent to produce a drainage plan by up to 50%.
4. To demonstrate the improved speed, accuracy, range, and versatility of an electronic survey instrument for application in wetland meadow development and traditional farm drainage.

Summary:

During June and July, 1986, 400 acres of farmland were surveyed using a Geodimeter electronic total station and data collector. The topography varied from gentle undulating to hilly terrain and from pasture to wetland meadow. By using a total station and data collector rather than the conventional level and transit, the time spent in the field collecting data was reduced by three to ten times. The accuracy of the survey was also improved to within centimeters on a typical field of more than 100 acres. Once the information is in the data collector, it is transferred directly to the micro-computer using the LANDIMPROVE program.

LANDIMPROVE is designed to carry out computerized mapping, landleveling design and subsurface drainage design. With the data in the computer a map is plotted within minutes using this program. Conventional plotting of the map completed, the drainage design is done by interactively drawing the system with the computer. Once the placement of the drainage system is finalized on the map, the computer analysis begins. The analysis produces the depth, grade, length, diameter, location and flow of every pipe. This information can then be used by the contractor to give the farmer a written cost estimate.

The design took approximately 75% the time traditionally spent and permits the designer to explore many alternative solutions because the computer does all the drawing and calculations in minutes.

The contractor can now give the farmer a more accurate drainage plan, analysis and cost estimate, totally produced by the computer in the field, in less than half the time it has traditionally taken.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

ALFALFA MANAGEMENT AND FERTILITY DEMONSTRATION

Project Number: 220

Supervision: B.T Laing, District Agriculturist, Creston

Co-operators: Colonel - Piper Farms; Christenson Bros. Farms;
Tsolum Farms;
Neville Gough, Soil Fertility Specialist, B.C.M.A.F.
Greg Tegart, Regional Field Crop and Range Specialist,
B.C.M.A.F.

Funding: D.A.T.E. 1986 - 87 \$1,234.00
Co-operator's machinery and labour \$277.00
Co-operator's land \$240.00

Objectives: 1) To demonstrate the importance of phosphorus fertilizer placement and application rates in alfalfa production.

2) To demonstrate, on adequately fertilized alfalfa stands, how cutting frequency and alfalfa stage of growth, at time of cutting, may affect the yield and longevity of the stand.

Summary: One large scale plot consisting of 12 - 1/2 acre phosphorus treatments and one small scale plot consisting of 30 - 4 ft. by 25 ft. treatments were established in May of 1986. Phosphate fertilizer was applied by three methods, deep banding, broadcast and incorporated. Various rates of phosphate were applied ranging from 0 to 220 lb./acre on the large plot and 0 to 250 lbs. on the small plot.

In July local farmers were able to view and discuss the plots with extension staff at a field day. Yield data collection and economic analysis of the various treatments will be under-taken over the next few years with ample opportunity for farmers to observe the results.

IMPROVED TECHNOLOGY IN SILAGE SAMPLING



Demonstration of "Auchincruive Corer"

Project Number: 221

Supervision: Dr. Steve Mason, Livestock Nutritionist, Abbotsford

Branches: Livestock

Funding: D.A.T.E. 1986-87 \$1,400

Objectives: To evaluate coring tools currently available for silage sampling and, if necessary, design and fabricate a more suitable device. When an appropriate tool has been identified, its use will be recommended to farmers and their advisors.

Summary:

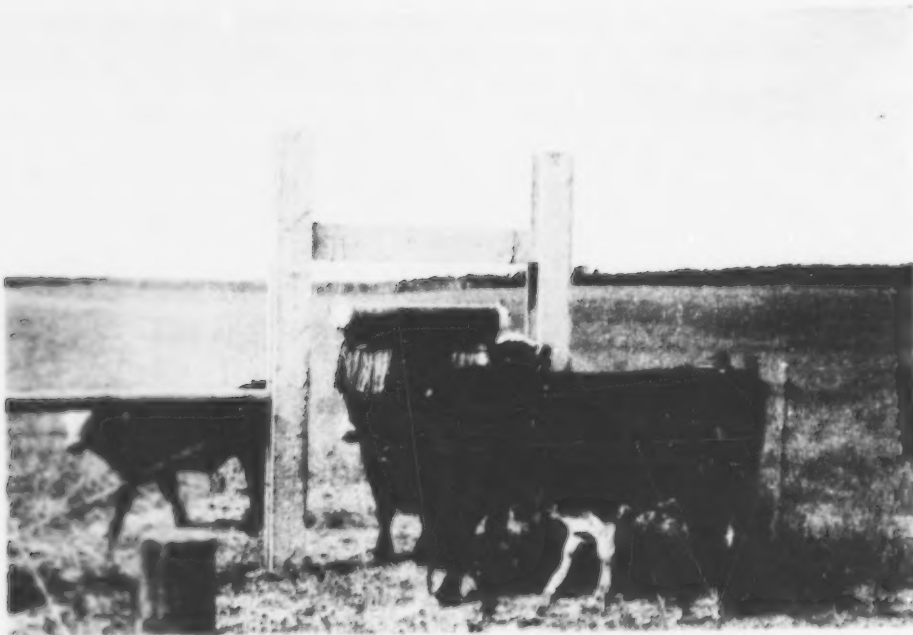
The currently recommended method of sampling pit, bunker and bagged silage is to take several "grab" samples from the working face and combine them to form a composite. Sampling in this manner leads to analytical results which are of little value in designing feeding programs for beef and dairy cattle because the resulting samples are not representative of the total bulk of silage available.

The availability of a silage coring device will allow cattle producers and their advisors to take representative samples of silage well in advance of its use so that analytical results can be used in designing winter feeding programs on a sound basis. This is currently being done for hay-based rations due to the availability of the "Penn-state" corer. In either case, when representative samples are not submitted for lab analysis, the design of feeding programs is simply guess-work. This ultimately leads to wastage of both feed resources and the potential productivity of the livestock.

The "Auchincruive corer" was designed in Scotland. It has been found as suitable for sampling silages here as it has in the U.K. It is relatively expensive, however (\$185 landed in B.C.) and an attempt is being made to obtain a less expensive tool of different design manufactured in Idaho. Once a decision is made on which design is best, local fabricators will be asked to estimate the cost of manufacturing the device here. Although the demand for corers in B.C. alone might make it difficult for local firms to manufacture the tool at a competitive price, some demand might be created in other provinces and states with a little promotional effort.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

CONTROLLING INSECT HARASSMENT OF CATTLE ON PASTURE USING
SELF-TREATMENT OILERS



Cattle Using Self-Treatment Gate Within Salting
Station Enclosure

Project Number: 223
Supervision: J. R. Green, Livestock Agrologist, Fort St. John
Co-operators: Beatton-Doig Livestock Association
Branches: Regional Extension, Central/Peace River
Funding: D.A.T.E. 1986-87 \$2,200
Beatton-Doig Association 1986/87 \$ 1,000 (Labour)

D.A.T.E. PROGRAM REPORT 1986

Objectives: To determine the most effective type of self-treatment station using Pest-Doom Cattle Oilers and Ciovap insecticide for controlling insect harassment of cattle on pasture.

Summary: The effectiveness of Pest-Doom Oilers filled with Ciovap insecticide as a low-cost insect control method for cattle on pasture was demonstrated at Umback Pasture in 1985. A fence surrounding a dugout, complete with two self-treatment gates (so cattle were forced to go through the oiler in order to drink) worked well.

It was observed, however, that the cattle entered the gates without actually drinking. It was decided to compare the effectiveness of forced-use oilers (fenced dugout) to volunteer type oilers located at random. An additional salting enclosure was used as an alternative to the dugout enclosure.

The project was carried out at Beaton-Doig Community Pasture during June, July and August when mosquitoes, blackflies and horseflies cause problems. The three different types of cattle oiler stations were built in separate areas:

- 1) Dugout Station - a one-hectare fenced (50 x 50 meter) area surrounding a dugout with two oiler gates installed.
- 2) Salting Station - a fenced 15 x 15 meter area complete with two oiler gates.
- 3) Four oiler gates were built within a third pasture.

The eight oilers monitored by observing the cattle as well as by recording the volume of insecticide used as compared to the number of cattle in each pasture.

Surprisingly, the cattle did not use the volunteer-type oiler gates as expected. The salt and water station oilers, on the other hand, were used considerably more on a consistent basis. The cattle seemed to require a reason for coming to the oiler gates (salt or water) even though they may or may not lick salt or drink.

The salt station was the most effective in terms of cattle use. It is also smaller and therefore cheaper to build. In addition, it could easily be made portable for use as a range management tool.

The project will be continued next year. Insect populations will be monitored on a more scientific basis to determine oiler effectiveness.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

HIGH TENSILE SMOOTH WIRE FENCE



Unrolling High-Tensile Smooth Wire.

Project Number: 224
Supervision: J. R. Green, Livestock Agrologist, Fort St. John
Co-operators: Bear Mountain Livestock Association
Kathy Sandy, Livestock D.A., Dawson Creek
Branches: Regional Extension Service, Central/Peace River
Funding: D.A.T.E. 1986-87 \$2,000

D.A.T.E. PROGRAM REPORT 1986

Objectives: To demonstrate the use of high-tensile smooth wire fencing using all available types of strainer assemblies, fasteners, droppers, and related current technology.

Summary: The benefits of high-tensile smooth wire fencing have been well established in the Southern part of the province; however, it is still considered new technology in the Peace. Two seminars were held in 1985 on smooth wire fencing at which time many possible advantages were pointed out including longevity, cost and maintenance. Many enquiries have been made to the local BCMAF offices requesting information on this type of fence.

Fencing of a 700 x 100 meter forage management nursery seeded at Bear Mountain Community Pasture in 1985 was an ideal opportunity to demonstrate the different techniques available.

The fence was built during September/October using currently recommended techniques and as many different types of droppers, connectors, knots and strainer designs as were available.

The site is easily accessible for anyone wishing to see the "state of the art" in high tensile smooth wire fencing.

B.C. MINISTRY OF AGRICULTURE AND FISHERIES (B.C.M.A.F.)
D.A.T.E. PROGRAM REPORT 1986

DEMONSTRATION OF AGRICULTURAL TECHNOLOGY IN THE SOUTH COASTAL
REGION (CHEMICAL CONTROL OF TANSY RAGWORT)



Municipal Officials From Abbotsford, Matsqui and
Central Fraser Valley Regional District Get A First Hand
Look At The Demonstration Site

Project Number: 225

Supervision: R.J. Charles, District Agriculturist, B.C.M.A.F.
Abbotsford

Co-operator: J. Fooks, Dairy Producer, Matsqui

Branches: Regional Extension Services - South Coastal

Objective: To demonstrate the effectiveness of the herbicide dicamba
for mid-season control of tansy ragwort (Senecio jacobaea)

Summary:

The noxious weed tansy ragwort is spreading very rapidly through the Fraser Valley. It is most often found along roadsides, ditches and in pastures used for grazing. Physical control methods such as pulling and mowing of plants has not been very successful.

A trial in Matsqui during the summer of 1986 showed that dicamba was effective in controlling tansy ragwort in pastures. Plants at the pre-budding stage were killed by the herbicide while those at the early budding stage showed a severe reduction in flowerhead production.

The demonstration results were encouraging. They showed that mid-season chemical control of the tansy ragwort was possible. The next phase is to explore spring and fall herbicide applications when the plant is at the rosette stage.

DEMONSTRATION OF AGRICULTURAL TECHNOLOGY IN THE
OKANAGAN/KOOTENAY REGION



John Parsons Calibrating A Portable Conductivity
(Salt) Meter

Project Number: 226

Supervision: J. E. Parsons, B. Laing, R. D. Hallman, H. Arndt

Co-operators: Dairyland Ltd.,
Kootenay Livestock Association,
B.C. Ministry of Forests and Lands
B.C. Fruit Packers and
Crop Protection Branch (B.C.M.A.F.)

Branches: Regional Extension Services, Okanagan Kootenay Region

Funding: D.A.T.E. 1986-87 \$5,000
B.C. Fruit Packers Ltd. \$500
Dairyland Ltd. \$100
Kootenay Livestock Association \$1,300
B.C. Ministry of Forests and Lands \$270

D.A.T.E. PROGRAM REPORT 1986

Objectives: To enhance the adaption of new technologies in the Okanagan/Kootenay Region by demonstrating new techniques and sponsoring presentations by technical experts from outside the region.

Summary: Use of pH and conductivity measuring equipment to test the growing medium in greenhouse cucumber and tomato production will demonstrate the value of controlling these two characteristics. Proper pH and conductivity levels enhance plant feeding, production and product quality. This project will commence in February 1987 and involve several Okanagan/Kootenay greenhouse growers.

In another project, laboratory reared pesticide resistant predacious mites were released into two apple orchards infested with phytophagus apple mites. The initial introduction of "super mites" was successful, but no conclusive recommendation can be made at this time. Monitoring will continue through 1987. The technique used is an application of biological control technology intended to reduce orchardists dependence on commercial pesticides.

The Rocky Mountain Trench area has been a source of commercial Christmas tree operations for decades; recently interest has been generated resulting from a new tariff on imported trees. Two instructional seminars were held, in Cranbrook and Invermere, featuring knowledgeable speakers from B.C. and Montana. Following the seminar, 78 people agreed to form a Kootenay Christmas Tree Growers Association. The focus of the association and Ministry extension efforts in this commodity will be on cultural practices on the extensive wild stands of Christmas trees in the Kootenays.

Another educational seminar/field day combination featured forage corn production in the Creston Valley area. The keynote speaker was Dr. David Major from the Agriculture Canada Research Centre in Lethbridge, who judged standing corn crops, spoke at a seminar and led a tour of selected farms to demonstrate and discuss methods of increasing net returns from forage crops.

MODIFIED INTENSIVE CEREAL MANAGEMENT



Field Scale Demonstration Of Intensive Cereal Managment

Project Number: 228

Supervision: J. A. O'Halloran, Field Crops Agrologist, Fort St. John

Co-operators: D. J. Hill Ltd.

Branches: Regional Extension Services, Central/Peace River

Funding: D.A.T.E. 1986-87 \$1,507
D. J. Hill Ltd. \$7,959

D.A.T.E. PROGRAM REPORT 1986

Objectives: To demonstrate the concepts of Intensive Cereal Management modified for farm scale in the Peace River Region. M.I.C.M. involved the efficient use of inputs to increase crop production which will then decrease the cost per unit of production. The following factors are managed in a total production.

- 1) Variety selection, seeding date, plant populations, seed and fertilizer placement, soil preparation.
- 2) Herbicide and fertility program optimum for farm location.
- 3) Insect and disease monitoring with control if necessary.
- 4) Use of plant growth regulators to enhance tillering and strengthen straw.

Summary: Given the current projected crop returns, producers are looking at ways to lower production costs. Reducing inputs will reduce both yields and production costs but could leave the producer with future problems. (ex Weed Control). One way producers could lower unit cost of production is by obtaining a substantial yield increase with a moderate increase and better use of inputs. I.C.M. is an "improved crop management" package. In Alberta yield increases of 33% have been realized in some years by practising I.C.M.

In 1985 the co-operator D. J. Hill Ltd. practiced I.C.M. on a limited scale and felt that they obtained an economic increase in yield.

In 1986 a side by side comparison was made between a modified Intensive Cereal management seeding and conventional. Closer attention was paid to herbicide selection and fertility in both areas. The intensive area had close to double the plant populations of the conventional seeding and used 30% more inputs. Field days were conducted to demonstrate the practices of I.C.M. Insect and disease monitoring showed no difference in 1986. The intensive and conventional areas were combined separately to determine an approximate yield. In the 1986 crop yield moisture was a limiting factor for plant growth. Area average crop yields were below normal due to moisture stress. Due to the

increased plant populations in the I.C.M. area, this area experienced greater stress than the conventional. Crop yields in the intensive area were approximately 90 bu/A and in the conventional area 94 bu/A. By paying closer attention to detail the co-operator exceeded his long term farm yield average substantially, even in a dry year. Give 1986 crop values the conventional yields resulted in a net loss of \$1.75 per acre and the intensive net loss \$50.30 per acre.

If 1985 crop values were used the co-operator would realize a net gain of \$60.61/acre in the conventional and \$9.51/acre in the intensive.

OSOYOOS WESTBENCH EFFLUENT IRRIGATION PROJECT



Craig Brownlee, Dr. Dave Stevenson, Joe Fitzpatrick and Paul Gableman inspecting Red Delicious Apples

Project Number: 229

Supervision: C.H. Brownlee, Assistant Director Soils Branch, Kelowna
Dr. D.S. Stevenson, Head Soils Section, Research Station, Summerland

Co-operators: Town of Osoyoos
J. Fitzpatrick, Project Employee
P. Gableman, Orchardist, Osoyoos
Agriculture Canada, Summerland Research Station

Branches: Soils Branch

Funding: D.A.T.E. 1986-87 \$24,000
D.A.T.E. 1987-88 \$23,000
Town of Osoyoos \$2,000

Objectives: To demonstrate the practical suitability of secondary treated sewage effluent as a source of irrigation water for the commercial production of tree fruits, grapes and vegetables.

Summary:

In 1983 the Town of Osoyoos, in cooperation with the Summerland Research Station, set up a series of experiments to test sewage lagoon effluent for irrigation of tree fruits, grapes and vegetables. Test plots were divided into those irrigated with effluent and those irrigated with well water. Irrigation of all crops is by the trickle method.

In 1986, as in previous years, the McIntosh, peach, cherry, grape and Red Delicious blocks received six treatments; effluent, well water, and three levels of nitrogen fertilization. In the vegetable block, tomatoes, cantaloupes, cucumbers, green peppers, onions and beans constituted the test crops and received only two treatments; effluent and well water. All other cultural practices, including early spring fertilization, were carried out as required by J. Fitzpatrick and P. Gableman according to the guidelines from the B.C. Ministry of Agriculture and Fisheries, Tree Fruit, Grape and Vegetable Production Guides.

Fruit trees and grapevines are being monitored for growth and for nutrient elements, as well as for those elements that might be toxic to plants or would leave harmful residues in the soil. An evaluation of the two kinds of water in terms of effects on insect populations in an apple orchard is also being carried out. Results of those studies are incomplete and will be reported later by Agriculture Canada. Yield data for the 1986 crop is shown in the following table.

As a result of low winter temperatures and spring frosts no cherry crop was produced, and damage to peach trees and grapevines may have affected average yields. 1986 was the first year of production for tree fruits and thus yield data should not be interpreted too broadly.

McIntosh apples were very responsive to both effluent and nitrogen while Red Delicious yield increased slightly with effluent. The peaches did not appear to respond to either nitrogen level or water source. Grapes showed a higher response to nitrogen than to water source. In the vegetable plots, total yields of all crops were slightly higher when irrigated with effluent as compared to well water, however, only the cantaloupes showed a significant favourable response to effluent. Early harvests did show higher yields with effluent suggesting that effluent irrigation may assist farmers in being first to market. Overall results of the experiments would indicate that not only has effluent shown to be suitable for the production of tree fruits, grapes and vegetables, but also has caused either increased yields or has made no statistical difference as compared to well water.

1986 CROP YIELDS

<u>Test Crop</u>		Average Yield (kg/4 trees)	
		<u>Well Water</u>	<u>Effluent</u>
McIntosh Apples	Low N	8.7	24.0
	Medium N	17.5	28.0
	High N	23.2	26.8
Red Delicious Apples	Low N	10.2	15.9
	Medium N	17.2	19.7
	High N	14.5	21.9
Red Haven Peaches	Low N	20.3	20.0
	Medium N	22.8	13.0
	High N	24.2	18.8
		Average Yield (kg/6 vines)	
		<u>Well Water</u>	<u>Effluent</u>
Okanagan Reisling Grapes	Low N	2.8	6.8
	Medium N	8.9	10.2
	High N	8.2	10.4
		Average Yield (kg/100 m of row)	
		<u>Well Water</u>	<u>Effluent</u>
VEGETABLES			
Tomatoes		982	1091
Cantaloupes		477	624
Cucumbers		772	927
Peppers		164	175
Onions		81	97
Beans		100	125

THE DETERMINATION OF THE CAUSE AND CONTROL OF A CELERY
YELLOWING DISORDER IN THE CLOVERDALE AREA



Varietal Response to Fusarium Yellows: Tall Utah
50-70HK Compared to Tall Utah 52-70R.

Project Number: 230

Supervision: D.J. Ormrod, Plant Pathologist, Cloverdale, B.C.

Project
Contractor: Mary-Margaret Gaye, Port Moody, B.C.

Co-operators: Cloverdale Lettuce and Vegetable Co-operative
Cloverdale Onion and Carrot Growers
J.C. Correll, Kansas State University
K. Dun, Dun Kin Farm Limited
D. Frey and A.R. Maurer, Agriculture Canada, Agassiz
H.S. Pepin, Agriculture Canada, Vancouver.

Branches: Crop Protection, Regional Extension Services
South Coastal Region

Funding: D.A.T.E. 1986-87 \$5,000

Objectives: To determine the cause of celery yellowing and stunting disorder which occurred in the Cloverdale area in 1985. To survey the 1986 celery crop to determine the distribution of the disorder. To evaluate control measures for the disorder.

Summary: Fusarium oxysporum was recovered from samples of celery showing yellowing and stunting symptoms and from field soil samples, which had been collected in the fall of 1985. Ten of thirteen isolates gave virulent reactions in pathogenicity tests on green celery (Tall Utah 52-70R). This test confirms the cause of the disorder as Fusarium oxysporum f. sp. apii.

Plants showing severe symptoms of Fusarium yellows were selected from celery fields in 1986. Forty-eight isolates were tested for virulence on both green (Tall Utah 52-70R) and yellow (Golden Plume) celery. The virulence pattern utilizing these two cultivars may help to determine the race of the pathogen found in the Cloverdale area.

In 1986, 27 growers in the Fraser Valley planted 179 acres of celery. Eleven of the 18 major farms surveyed had the disease. In total, approximately 7 acres of celery could not be harvested this season because of the disease for a loss to the industry of over \$65,000. Reports of similar problems in previous years suggest approximately 80 acres which have a severe infestation of the pathogen and should not be planted with celery.

Field trials were conducted in an infested commercial field. Each treatment was applied to 3.7 x 1.4 m plot and was replicated four times in a randomized complete block design.

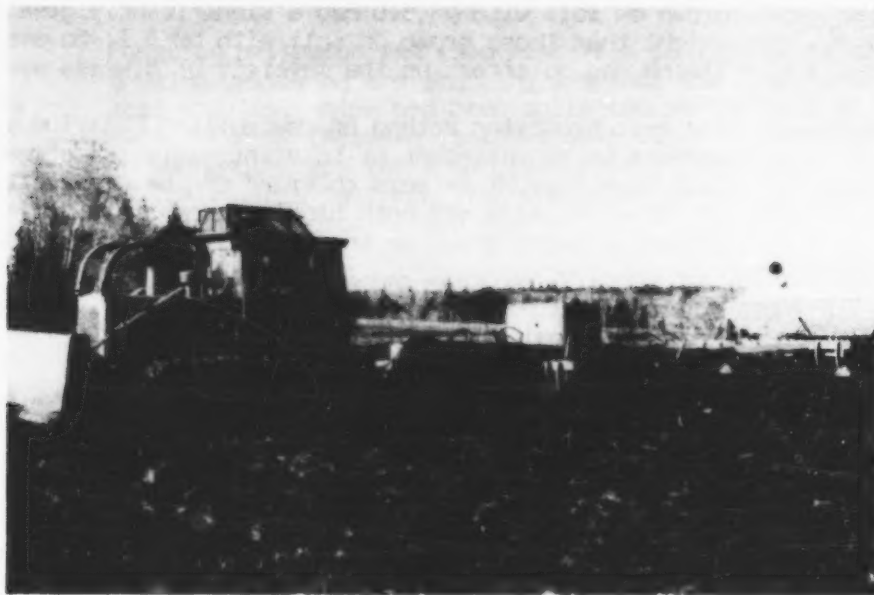
Applications of metalaxyl and oxadixyl fungicides were not effective, further indicating that Fusarium and not Pythium was the cause of the problem.

Two sources of nitrogen and potassium were each applied to two varieties of celery. Tall Utah 52-70HK plants produced a significantly greater fresh weight and were less affected by the disease than Tall Utah 52-70R plants. There was no significant effect due to the source of nitrogen or potassium.

A trial was conducted to determine the effect of soil liming. Tall Utah 52-70R and Tall Utah 52-70HK were each planted in a limed (10T/ha, pH 7.0) and an unlimed soil (pH 5.1). Tall Utah 52-70HK plants had significantly greater weight and less disease than 52-70R. Plants grown on soil with pH 7.0 had a significantly greater weight than those grown on soil with pH 5.1, however, liming had no effect on the severity of disease symptoms.

The most promising method of controlling Fusarium yellows appears to be resistant or tolerant varieties of celery. Tall Utah 52-70HK is more tolerant of the disease than 52-70R or Florida 683 both highly susceptible varieties currently being grown in the Fraser Valley.

RANGE SEEDING DEMONSTRATION - GANG RANCH AND LEECHES LAKE



"Seeding Plot With BCMAF Range Seeding Equipment"

Project Number: 231

Supervision: D.R.Blumenauer, Provincial Range Specialist,
Williams Lake

Co-operators: Ministry of Forest & Lands, Williams Lake
Gang Ranch
Leeches Lake Permittees

Branches: Field & Special Crops, Engineering
Regional Extension Services

Funding: D.A.T.E. 1986-87 \$3,000
Field & Special Crops Branch \$1,600
Ministry of Forests & Lands \$2,000

D.A.T.E. PROGRAM REPORT 1986

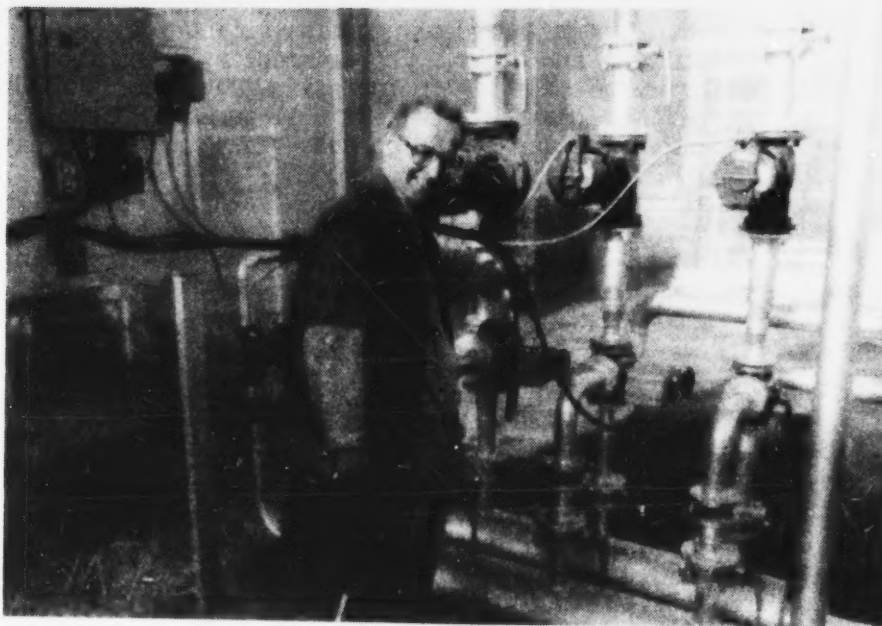
Objectives: To demonstrate the performance of selected grass species versus Nordan Crested Wheatgrass on Chilcotin upper grassland sites.

Summary: Based on performance, Nordan Crested Wheatgrass is the preferred species for seeding interior grassland sites for spring livestock forage. However, a number of initially well established, productive seeded stands on Chilcotin sites have declined significantly in productivity and vigor. Encroachment by other less desirable species is also increasing. It appears Nordan Crested Wheatgrass may be less well adapted to the Chilcotin grasslands than to grasslands in other areas.

14 selected grass cultivars were seeded in October 1986 with the Ministry range seeding equipment on two sites - Leeches Lake and Gang Ranch. The cultivars, including Nordan, Parkway and Fairway Crested Wheatgrass, were selected on the basis of performance on small variety test plots established within the region. The seeded sites are within large established seedings that are declining in productivity and of great concern to the users. The seeding of each cultivar was randomly replicated four times on both sides. Approximately one acre of each cultivar was seeded on each site.

A portion of each site will be fenced in 1987 to exclude livestock grazing. The unfenced portion will be grazed annually. Frequency, percent cover and productivity will be monitored 1987-1992 on both grazed and ungrazed sections. Information compiled will determine whether cultivars other than Nordan Crested Wheatgrass are suitable for spring forage production on Chilcotin grasslands.

GREENHOUSE GAS HEATING



Greenhouse Climate Control Specialist, Mr. Anton Zandbelt from Wageningen, The Netherlands, pointing out the bypass valve at a Langley greenhouse operation.

Project Number: 232

Supervision: Phil Johnston, Structures Engineer, Abbotsford

Co-operators: Brian Mauza, Greenhouse Horticulturist, Abbotsford
Chris Dyble, Agricultural Specialist
B.C. Hydro, Abbotsford

Branches: Engineering, Special Crops

Funding: D.A.T.E. 1986-87 \$2,100

Objectives: To bring in to B.C. from the Netherlands, a mechanical engineer specializing in heating systems to make technical presentations to B.C. greenhouse growers on the subject of heating system design and control in greenhouses.

Summary: The forum was the Greenhouse Gas Heating Seminar, sponsored by B.C. Hydro and B.C.M.A.F. held on October 30th, 1986 at the Newlands Golf and Racquet Club in Langley. The event was attended by over 240 growers, equipment suppliers, students and fieldmen from all over the province.

The keynote speaker was Mr. Anton J. Zandbelt, specialist in climate control and heating systems, from Wageningen, The Netherlands. Mr. Zandbelt's depth of knowledge was impressive and response from growers was very positive. In addition to the seminar, Mr. Zandbelt made 12 site visits to growers, consulted with one heating system contractor and held a small group seminar on humidity control with a group of 10 growers. Design data from The Netherlands was explained and submitted to the project supervisor as an aid to improved design of greenhouse heating systems. A valuable contact has been established in Mr. Zandbelt for future discussions.